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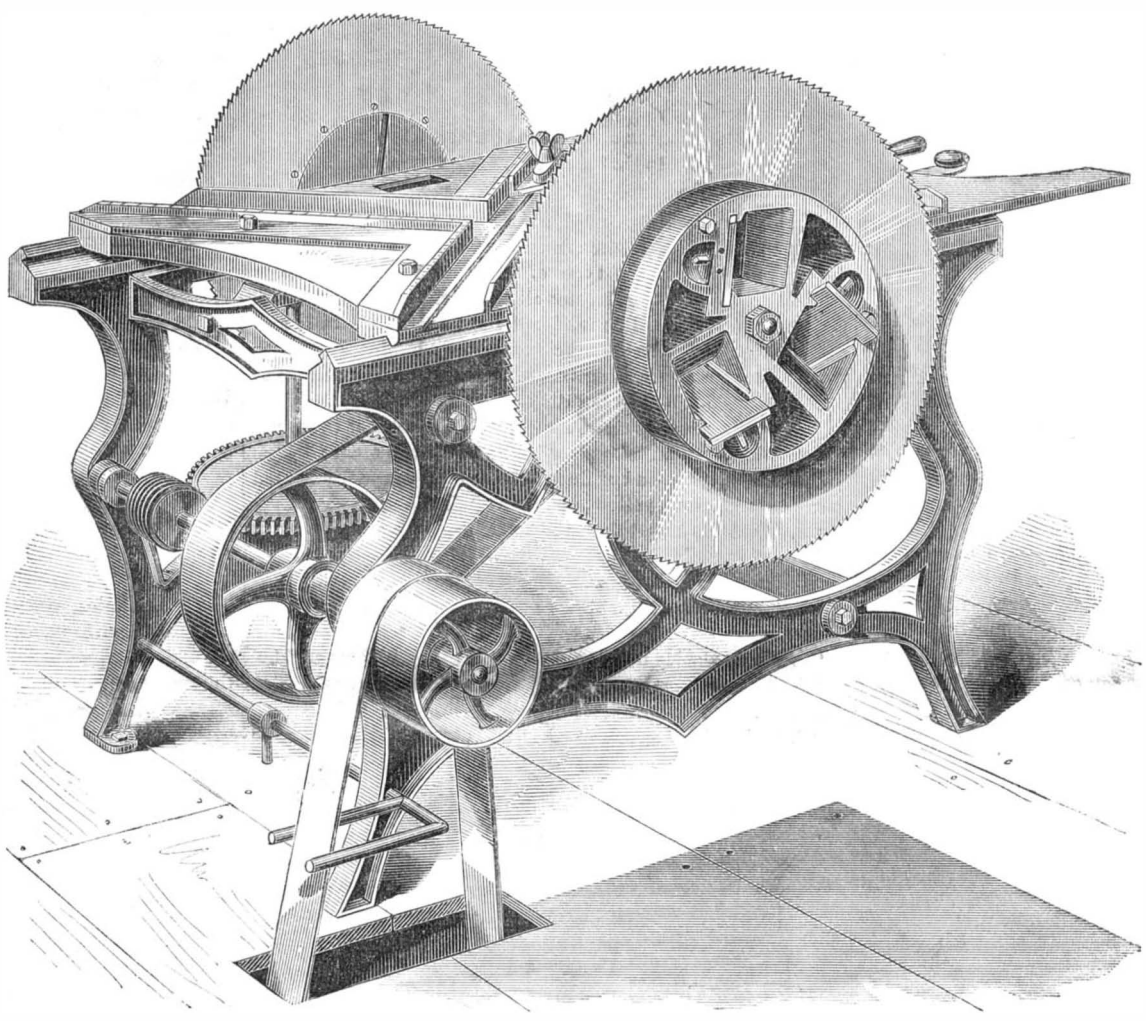
Improved Machine for Mitering Frames.

The joints of rectangular frames as picture, looking glass, window, and other frames must be cut at the proper angle before being put together; and to make perfect joints they should be planed as well as sawed. Usually, these two processes are performed on separate machines, and sometimes the fitting is done by a hand plane. The machine, however, which is herewith illustrated performs both these operations at one time, perfectly and with great rapidity.

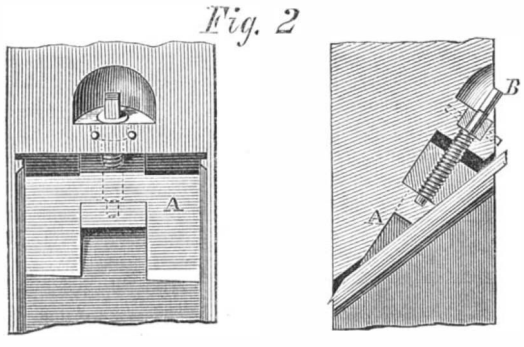
The machine is an iron frame carrying a sliding platen, also of iron, on the top, and having two saws and cutter heads mounted on a single central shaft. This shaft, with its combined saws and cutters, is driven by a belt running on a small pulley on it, driven by a belt running from a larger pulley at the rear of the machine and near the floor, the shaft of which carries a fast and loose pulley. On this shaft is also a worm engaging with a worm gear on an upright shaft, having on its upper end a pinion engaging with a rack fixed to the under side of the sliding platen. This combination is the feed of the platen. The upper journal of the vertical shaft runs in the end of a lever pivoted to a brace under the platen, the other end of the lever being a handle projecting beyond the forward end of the platen. A slight transverse movement of this handle throws the pinion out of gear with the platen rack, and by pressing lightly on the handle of another lever, pivoted to the platen, the under face of the lever being covered with leather, it engages with the top of the saw shaft under the platen and the revolving of the shaft carries the platen rapidly back ready for another forward movement, which is obtained by the action of the pinion and rack thrown into gear. If the automatic feed is not desired, the pinion and rack may be left disengaged, and the platen moved simply by pushing with the hand, as on ordinary sawing machines.



SANDERS' PATENT MITERING MACHINE.

For guiding and holding the stuff to be sawed there are three frames, formed at an angle of 90°, secured to the face of the platen, their raised edges being graduated to inches and their parts, and in a score cut diagonally across the platen is a sliding guide, or holder, that may be held by a thumb nut and bolt at any point desired, to regulate the length of the piece to be cut.

Fig. 2



The saws are not ordinary circular saws, but annular, the blades being secured to turned wrought iron flanges insuring stiffness and perfect truth. These flanges are bolted to hollow heads, which are formed to receive two, three, or more planing bits, or cutters, that finish the joint of the stock after it passes the edge of the saw. The method of setting and securing these blades is peculiar and very effective. It is shown in detail in Fig. 2.

These hollow heads are divided into as many radial compartments as there are planing bits. The sides of these compartments have planed ledges on their sides, which hold the edges of one side of the bits. They are seen in perspective, in Fig. 1. These ledges are planed or filed perfectly smooth and straight. On the other side of the bits are wedges, A, Fig. 2, with planed surfaces meeting the back of the bit. These wedges are moved by means of screws, B, the heads of which are seated in semi-circular recesses in the head, as seen, and turned by means of a socket wrench. The edge of the bit being set at the proper distance from the inner face of the head, a slight turn of the screw brings the wedge down upon it and hugs it with great force against the ledges.

This method of securing cutters (which may be also applied to any tenoning or grooving machine) leaves a clear throat for the discharge of chips, unimpeded by bolt head or other devices, and does not neccssitate the slotting of the bit, which is simply a plain plate.

This device was patented through the Scientific American Patent Agency, May 26, 1868, by John J. Sanders, Jr., who may be addressed for the purchase of the entire right, or for other information relative to the patent, at 257 Hudson street, New York. He will also sell the right to hold planing irons, etc., by his method, to plane makers, wood workers, and others wishing to use it.

NATURAL SELECTION--THE DARWINIAN THEORY.

The theory of the origin of species as first enunciated by Darwin, and which has been so widely discussed, has undoubtedly been gaining ground among the most celebrated naturalists. The basis of that theory is, first, that variations, so slight as not to form distinctive features of classification, are constantly occurring in the reproduction of both plants and animals; second, that these variations of form are capable of transmission to progeny, and that the peculiar characteristic resulting from the variation is generally intensified in its transmission; third, that whenever the variations give their inheritors peculiar advantages in obtaining sustenance, etc., over that possessed by their fellows, they will live longer, will procreate more, and consequently, in the lapse of ages, will extinguish the weaker types. The author of the theory called this process natural selection, and supported his theory by the results of numerous experiments, in which, by artificial selection, he produced similar results to those which he claimed for the natural selection. He experimented mainly with animals which propagate very rapidly, as pigeons, rabbits, etc., and thus was enabled to produce between generations widely separated, very astonishing differences in form, color, and habits. He produced such marked changes in the descendants of wood pigeons, that he truly said, that had they been found at large by a naturalist, they would not have been classed with the same genus. They ate meat, had hooked beaks, and talons, and were both in appearance and habit similar to the family of hawks.

When this theory was first propounded, it met both vehement opposition and ridicule. It was attacked by philosophers and wits, and formed the subject of many a lampoon and satire. It was denounced as opposed to the teachings of revelation, as a system of guesses, which were not sustained by either facts or logic. But there was a vitality in the theory, and the conclusions of a man who fortifies his opinions with such a host of facts as Mr. Darwin brought to sustain his, are not easily put aside. One after another the thinkers of the entire world have slowly been accepting the theory, until it may fairly be doubted whether any hypothesis is more nearly established upon a permanent basis.

Dr. J. D. Hooker, in his recent address to the British Association at Norwich, thus reviews this subject:

"Ten years have elapsed since the publication of 'The Origin of Species by Natural Selection,' and it is hence not too early now to ask what progress that bold theory has made in scientific estimation. The most widely circulated of all the journals that give science a prominent place on their title pages, the *Athenæum*, has very recently told it to every country where the English language is read, that Mr. Darwin's theory is a thing of the past; that natural selection is rapidly declining in scientific favor; and that, as regards the above two volumes on the variations of animals and plants under domestication, they 'contain nothing more in support of origin by selection than a more detailed reasseveration of his guesses founded on the so called variations of pigeons.' Let us examine for ourselves into the truth of these inconsiderate statements.

"Since the 'Origin' appeared ten years ago, it has passed through four English editions, two American, two German, two French, several Russian, a Dutch, and an Italian; while of the work on 'Variation,' which first left the publisher's house not seven months ago, two English, a German, Russian, American, and Italian edition are already in circulation. So far from natural selection being a thing of the past, it is an accepted doctrine with every philosophical naturalist, including, it will always be understood, a considerable proportion who are not prepared to admit that it accounts for all Mr. Darwin assigns to it. Reviews on 'The Origin of Species' are still pouring in from the Continent, and Agassiz, in one of the addresses which he issued to his *collaborateurs* on their late voyage to the Amazon, directs their attention to this theory as a primary object of the expedition they were then undertaking. I need only add, that of the many eminent naturalists who have accepted it, not one has been known to abandon it; that it gains adherents steadily, and that it is, *par excellence*, an avowed favorite with the rising schools of naturalists: perhaps, indeed, too much so, for the young are apt to accept such theories as articles of faith, and the creed of the student is also too likely to become the shibboleth of the future professor. The scientific writers who have publicly rejected the theories of continuous revolution or of natural selection, or of both, take their stand on physical grounds, or metaphysical, or both. Of those who rely on the metaphysical, their arguments are usually strongly imbued with prejudice, and even odium, and, as such, are beyond the pale of scientific criticism. Having myself been a student of moral philosophy in a northern university, I entered on my scientific career full of hopes that metaphysics would prove a useful Mentor, if not quite a science. I soon, however, found that it availed me nothing, and I long ago arrived at the conclusion, so well put by Agassiz, where he says, 'We trust that the time is not distant when it will be universally understood that the battle of the evidences will have to be fought on the field of physical science and not on that of the metaphysical.' (Agassiz on the 'Contemplation of God,' in the *Kosmos*. *Christian Examiner*, 4th series, vol. xv. p. 2). Many of the metaphysicians' objections have been controverted by that champion of natural selection, Mr. Darwin's true knight, Alfred Wallace, in his papers on 'Protection' (*Westminster Review*) and 'Creation of Law,' etc., (*Journal of Science*, October, 1867), in which the doctrines of 'continual interference,' and the 'theories of beauty,' kindred subjects, are discussed with admirable sagacity, knowledge, and skill. But of Mr. Wallace and his many contributions to philosophical biology it is not easy to speak without enthu

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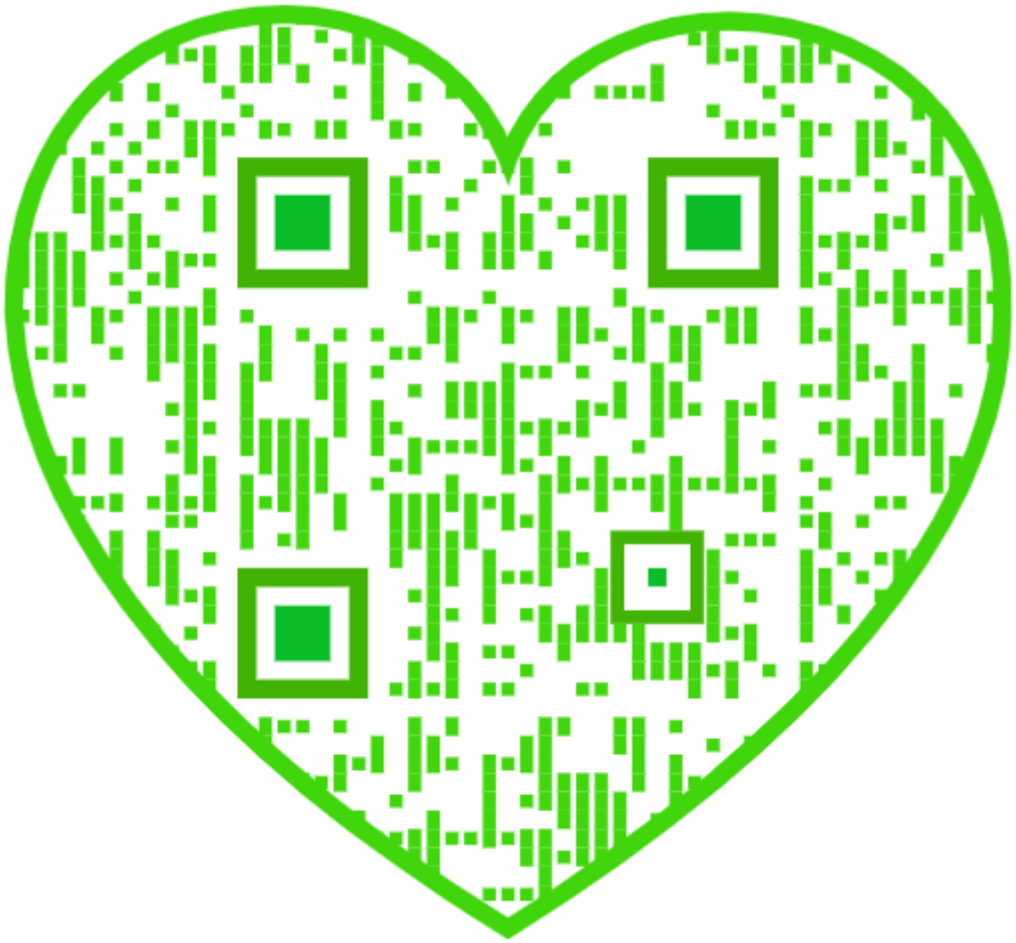

sism; for, putting aside their great merits, he, throughout his writings, with a modesty as rare as I believe it to be unconscious, forgets his own unquestioned claims to the honor of having originated, independently of Mr. Darwin, the theories which he so ably defends.

"On the score of geology, the objectors rely chiefly on the assumed perfection of the geological record; and since almost all who believe in its imperfection and many of the other school, accept the theories both of evolution and natural selection, wholly or in part, there is no doubt but Mr. Darwin claims the great majority of geologists. Of these, one is in himself a host, the veteran Sir Charles Lyell, who, after having devoted whole chapters of the first editions of his 'Principles' to establishing the doctrine of special creations, abandons it in the tenth, and this, too, on the showing of a pupil; for, in the dedication of his earliest work, 'The Naturalist's Voyage,' to Sir Charles Lyell, Mr. Darwin states that the chief part of whatever merit himself or his works possess has been derived from studying the 'Principles of Geology.' I know no brighter example of heroism, of its kind, than this, of an author thus abandoning, late in life, a theory which he had for forty years regarded as the very foundation of a work which had given him the highest position attainable among scientific writers. Well may he be proud of a superstructure raised on the foundations of an insecure doctrine, when he finds that he can underpin it, substitute a new foundation, and, after all is finished, survey his edifice, not only more secure, but more harmonious in its proportions than it was before; for assuredly the biological chapters of the tenth edition of the 'Principles' are more in harmony with the doctrine of slow changes in the history of our planet than were their counterparts in the former editions."

A NEW TREATISE ON STEEL.

We are in receipt of a new treatise upon the theory, metallurgy, properties, practical working, and use of steel, translated from the French of M. H. C. Landrin, Jr., C. E., by A. A. Fesquet, Chemist and Engineer, with an appendix on the Bessemer and the Martin processes for manufacturing steel, from the report of Abram S. Hewitt, U. S. Commissioner to the Universal Exposition, Paris, 1867.

Among the many claimants to public favor, which have appeared upon this subject, we have met with none which appears to us better adapted to the universal necessities of all directly or indirectly interested in the metallurgy of steel. The mechanic will find here the information he requires, conveyed in a simple and practical form unburdened with unnecessary verbiage, and arranged in convenient form for reference and condensed without neglect of important principles. A good specimen of the work is the following extract, upon the tempering of steel. The temperatures are given in degrees of the centigrade scale. The reader can easily convert them into degrees of the Fahrenheit scale, by the following simple rule: Multiply the degrees expressing any temperature in the centigrade scale by 2. Subtract one tenth of the product from the product itself, and add 32 to the remainder. The result will be the number of degrees of the Fahrenheit scale, expressing the same temperature.

"Notwithstanding what has been said, and the so-called experience of some practical metallurgists, pure water is the best liquid for hardening steel. It is a mistake to believe, with the ancients, that certain waters are more adapted to this operation than others. The only difference lies in their temperature. A workman of Caen, Mr. Damesme, who has published a diffuse work on steel, has tried the hardening of steel in the juices of vegetables, and has ascertained that there is comparatively no advantage over hardening in water. Mercury has no other property than that of being cold, and of producing a hardness which can be obtained with water at the same temperature. Tallow and oils, where carbon is one of the constituent elements, produce an imperfect hardening, but prevent a loss of carbon. When by overheating, steel has been burned and decarburized, the oils and fatty matters are useful, because they give back to the steel a part of the carbon lost in the fire. Some acids, such as sulphuric, are justly considered as imparting more hardness to steel, by dissolving a film of iron from the surface and exposing the carbon. As for urine, alcohol, brandy, and a thousand other liquids extolled by ignorant workmen, they are not worth as much as water, which has the advantage of being abundant everywhere, cheap, and adapted to all changes of temperature.

"Steel should be hardened to the point corresponding to its nature and its use. Indeed, it is possible to correct the quality, either by increasing the hardness by a very cold dipping liquid, or by producing more elasticity when tempering; but these corrections are left too much to the judgement of the workman to be considered efficacious. For instance, in fine cutlery, and principally in the manufacture of surgical instruments, every instrument must have its peculiar hardness and tenacity. Very few men always succeed in the operation, which, generally, is left to chance.

"Hammers, cold chisels for iron, drills, engraving tools, require a strong hardening, a great hardness; sabres razors, straw cutters, etc., do not require to be dipped into very cold water; table knives, scissors, and springs, require less hardness.

"We readily understand, that if the temperature the most proper for the degree of hardness and tenacity of the instrument were known, it would be sufficient to raise the instrument to that temperature, and to immerse it afterward in water. Some workmen heat the steel which is to be hardened, much above a cherry redness, allow it to cool slowly in the air, and wait until it has taken a certain color, previous to plunging it in water. This is a very bad practice, because by an excess of heat, there is a loss of carbon, and an alteration of the steel, which has then large grains, and is without tenacity at the edges. In order to graduate the heat, and to bring the instruments to various and distinct temperatures D. Hartley, in 1789, thought of using a pyrometer, when hardening This process, very good, indeed, was difficult in practice. Sir Parkes was more successful, by determining in advance the various points of fusion and of perfect liquidity of certain metallic alloys. These temperatures being known, steel is plunged into the molten alloy, the same as into a forge fire, and when thoroughly heated, is dipped into cold water.

"Although this method has not been generally employed, for the sake of its ingenuity, we will take from the compositions of Sir Parkes, those which most nearly correspond with the various colors and temperatures necessary for certain instruments.

"The temperatures are in degrees centigrade:—

Lead.	Tin.	Temperature of fusion,
7 parts.	4 parts.	213.40°
7½ "	4 "	221.11°
8 "	4 "	225.50°
8½ "	4 "	232.22°
10 "	4 "	240.90°
14 "	4 "	251.90°
19 "	4 "	262.35°
30 "	4 "	273.90°
48 "	4 "	284.90°
50 "	4 "	289.20°

Linseed oil boils at 312.40°.
Lead melts at 319°.

"The metallic baths above named are certainly not for heating steel previous to hardening, but for tempering steel already hardened.

"Hardened steel is generally harsh and brittle; so is chilled iron, probably for the same cause. If, after a strong hardening, which will be the type of extreme hardness, steel is heated again to redness, it loses all the hardness it had gained, becomes soft, and will be rendered hard again only by a new hardening. Between these two extremes: hardness and softness, there are several degrees which are as many shades of the qualities adapted to certain uses.

"These degrees are made apparent by the color of the metal when reheated, and take place in the following order:

"1. Being put upon burning fuel, the steel gradually heated becomes tarnished, yellow, and *straw yellow.*

"2. The heat increasing, the color deepens, and reaches a gold yellow, *full yellow,*

"3 Afterward, the steel takes several shades, rapidly following and blending with each other; they are purple, pigeon's throat, copper, *brown purple.*

"4. These shades become deeper until they become *violet.*

"5. Afterward, they pass rapidly to indigo blue, *full blue, dark blue.*

"6. This color becomes weaker, and gives a *sky blue* more or less pure.

"7. The blue takes a greenish tint and produces shades which are gray and *sea-green.*

"8. At last, the steel *reddens,* and will no longer give distinct colors.

"The shades of these eight colors, which are called tempering colors, and perfectly distinct, very apparent, and easy to recognize; but they take place only after hardening and on clean steel. The metal which has not been hardened, will not show these colors so plainly; the shades are mingled, blended, and less in number.

"The colors, during the tempering, are a sure guide for the workman, of the degree of hardness or tenacity he desires to obtain. Dark blue indicates a great tenacity, straw yellow produces a greater hardness, and is the tempering shade for razors. Bistouries, lancets, penknives, erasing knives, some scissors, and generally blades requiring body, are reheated to full yellow. The strong blades for table knives and gardening tools are tempered to a brown or purple brown. Purple is the proper color for large shears. Violet and dark blue are for springs; with a violet color, the spring will be very elastic but brittle, a blue shade will make it very resisting. It is very difficult to break a spring reheated to the color of water; but its elasticity is a great deal lessened.

"The temperatures (centigrade) corresponding to these colors, and best adapted to the tempering of various instruments are seen in the following table:

Lancets	210°—215°
Other surgical instruments	220
Razors	225
Penknives, erasers	230—235
Scalpels, cold chisels for iron	240
Shears, sheep shears, gardening tools	250
Hatchets, axes, plane irons, pocket-knives	260—265
Table knives, large scissors	270—275
Swords, watch springs	285
Large springs, daggers, augers	290
Saws, some springs	310—315
Various other instruments requiring less hardening	320

"The hardened instruments are reheated in or upon a live fire, easily regulated, and without the help of bellows as far as practicable. An intelligent workman will cease blowing as soon as he perceives that the metal begins to change its color. The proper shade must come by itself without increasing the fire, and must be regular all over, before the piece is plunged in cold water. Sometimes this last dipping is omitted.

"The small pieces, such as penknives, erasing knives, etc., rest upon a wire cloth put into the middle of the fire; when they have reached the proper color they are cooled in water.

"A lancet requires a special tempering: the shank must be blue; from there the color will be first purple, next brown, and at the point, full yellow. These various shades upon one blade are a necessity, on account of the degree of hardness and tenacity required by this instrument. Full yellow will produce the proper sharpness, but would not be suitable to the rest of the blade, which, instead of hardness, must have tenacity and elasticity.

"A good workman, willing to give the greatest perfection to an instrument, will be very careful when tempering it, in order to obtain the various shades which are necessary. A knife, for instance, must be brown purple at the cutting edge, purple in the middle, and sea green at the back, to unite the hardness of the cutting edge, with a certain amount of resistance which will prevent its breaking under a strain.

"This is obtained by using certain precautions, and above all, by not going beyond the proper degeee, because it is very difficult to retrace the steps. If the fire is too strong or irregular, part of the edge may be purple brown, while the other is only straw yellow; then, by pinching the blade between red hot tongues, at the place which should be more heated, the temperature rises rapidly, and the instrument is brought up to the proper tempering point. Certain scraping and burnishing tools, and steels for sharpening, do not require any tempering, because they cannot be too hard.

"It happens though rarely, that steel bars which have been and left for some time in store rooms, will break with a noise and will project to a distance, pieces of steel from the corners. This phenomenon does not take place with small pieces, such as smooth or even bastard files, but will happen with large rubber files, mostly those of cemented steel. By hardening too quickly, the same effect is sometimes produced; the workman receives a shock in his arm at the moment of dipping: part of the piece breaks off with a noise, or the steel splits along its length"

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STEAMER FOR COMMON ROADS—VULCANIZED RUBBER TIRES.

We noticed some time ago an adaptation of rubber to wheel tires for traveling over rough and uneven surfaces. We copy the principal points of an account given in one of our Scottish exchanges—the Edinburgh *Scotsman*—of an experiment made with R. W. Thomson's patent road steamer in Edinburgh, Scotland. "It drew four loaded wagons each of which weighed, when empty, 2¾ tuns and carried a load of 5¼ tuns of coal, making the gross weight of the wagons 32 tuns. The road steamer weighs 8 tuns. Thus a total of 40 tuns was in motion. The road steamer had drawn the train from Newbattle Collieries, eight miles from Edinburgh, over a very hilly road, with rising gradients of 1 in 16. The hill from the Pow Burn up to Minto Street is both long and steep, but the road steamer drew its train to the top with the most perfect ease. It was very curious to watch the behavior of the patent india-rubber tires of the road steamer as they passed over the various descriptions of road surface. In the outskirts of the city, where the roads are macadamized, there were many places where broken stones had just been spread on the surface. Over these sharp loose stones the india-rubber tires of the road steamer passed without crushing or in fact disturbing them in the least. The roughest and sharpest bed of broken stones sank gently into the elastic cushion of india-rubber, which rose from the contact with the most jagged fragments of stone without any trace or mark of injury. The perfect command which the conductors of the train had over its movements enabled them to control both its course and speed with the utmost precision. The line of streets through which it passed—viz., Minto street, Clerk street, Nicolson street, South Bridge, North Bridge, Princes' street, Leith street, and Leith Walk—are always the most crowded streets in the city, but at the time the train passed through these thoroughfares there happened to be an unusually great current of traffic passing in a contrary direction towards the South Side Gymnasium, where some games were going on, which gave rise to a great stream of omnibuses, cabs, and conveyances of every description, in addition to a great crowd of pedestrians. Notwithstanding all these obstacles, aggravated by the streets being at some points under repair and closed for one-half of their width, no difficulty was experienced in steering clear of every impediment. The crowd of spectators increased with such rapidity that by the time the train was passing the University thousands were trying to catch a glimpse of the novel sight, and when crossing the High street the swarms of idlers who give such a busy aspect to that locality rushed in vast numbers to see how the train would descend the steep incline from the High street to the Bridge. This was done with as much ease and quietness as if there were no hill at all. The extremely curious way in which the whole four wagons follow, snake like, in the track of the road steamer was clearly seen in passing out of North Bridge into Leith street. First, the road steamer had to turn to the right, and before the last wagon was round the corner to the right, the road steamer had already turned sharp to the left to go into Leith street—thus the train actually assumed the form of the letter S, every wagon going over the same ground as the road steamer with the most perfect accuracy. The very steep and crooked descent of Leith street, which has a gradient of probably 1 in 12, was managed with perfect ease, and the train pursued its way down Leith Walk, along Junction street, and up Bonnington Road to the works of T. M. Tennant & Company, where it had to deliver the coals. In passing out of Junction street into Bonnington Road there is a sharp acute angle, so that the train had actually to double back on itself; however, it rounded the corner without the smallest difficulty. The final maneuver was one which the conductors of the train did not expect to be able

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to accomplish without breaking it into two portions. It had to be taken out of the Bonnington Road, which is a narrow street of 30 feet in width, into a lane 25 feet wide, which rises with a steep incline to the entrance gate of Bowershall Works. It was determined to attempt this narrow entrance with the entire train of ninety feet long, and it passed in at the first trial, leaving so much space to spare that it was found, on afterward measuring the wheel tracks, a width of fourteen feet would have sufficed, though the breadth of the wagons is seven feet. The train curved in through the narrow entrance, mounting at the same time the steep incline leading up to the works, and drew up in the yard in perfect order.

"There can be no doubt this invention of the application of vulcanized india-rubber to the tires of road steamers forms the greatest step which has ever been made in the use of steam on common roads. It completely removes the two fatal difficulties which have hitherto barred the way to the use of traction engines—viz., the mutual destruction of the traction engine and the roads. The india-rubber tires interposing a soft and elastic cushion between the two, effectually protect them both from every jar and jolt—in fact, as much so as if the engine were traveling over a tramway of india-rubber. The road steamer, which drew the four wagons of coal from Newbattle Colliery on Saturday, was constructed to draw less than one-half of the weight comprised in the coal train. It was perhaps hardly fair to test it more than the double of its legitimate work, but it was deemed best to test it with great severity, and the great success of the trial has surpassed every expectation."

The London *Engineer* says:

"This road steamer has wheels made of a material which at the first sight does not look a very likely substance to stand the heavy work they are subjected to. The tires are made of bands of vulcanized india-rubber about 12 inches wide and 5 inches thick. Incredible as it may appear, this soft and elastic substance not only carries the great weight of the road steamer without injury, but they pass over newly broken road metal, broken flints, and all kinds of sharp things, without even leaving a mark on the india-rubber. They do not sink into the road in the least degree. They pass over the stones lying on the surface without crushing them. Those soft and elastic tires resemble in some degree the feet of an elephant. Both the camel and elephant have very large soft cushions in hard hoofs, and no other animal can stand so much walking over hard roads as they can accomplish.

"The power required to propel the road steamer is very much less than what would be required if the tires were hard and rigid. They do not crush nor sink into the roadway. The machine, as it were, floats along on the india-rubber, and all the power used in crushing and grinding the stones under rigid tires is entirely saved. It might at first sight be supposed that it would take a great deal of power to propel a heavy carriage on soft tires; but if the tires are elastic as well as soft, the power used in compressing the tire in front of the wheel is nearly all given back as the elastic tire expands behind the wheel.

"The india-rubber tires require scarcely any more power to propel them over soft bad roads, or over loose gravel roads, than on the best paved streets. The reason of this is quite obvious; they do not sink into roads, and do not grind down the stones in the least degree.

"Trials have been made at Leith by running the road steamer across a soft grass field, in which an ordinary steam carriage would certainly have sunk. The way it ran through the grass, without even leaving a track, was very remarkable; but when it made for a part of the field which had just been covered with loose earth to the depth of one or two feet, and ran straight across, and then back through the deep soft soil, the surprise of those present was great indeed. The weight of the road steamer is between four and five tuns; and yet the wheels in passing over the loose earth compressed it so little that a walking stick could easily be pushed down in the track of the wheels without any exertion. It is quite clear that one of the great difficulties farmers have had to contend with in using steam engines for ploughing is now removed, for the road steamer will run through any field, even when newly ploughed, without any difficulty. After various evolutions, showing the ability of the road steamer to run about where there were no roads, it passed out into the street, and, taking a large omnibus full of passengers in tow, it proceeded up the Bonnington road to Messrs. Gibson & Walker's mills, where it took a large wagon, weighing with its load of flour about ten tuns, up a steep lane full of holes and ruts, and rising with a gradient of 1 in 20. It was obvious that the road steamer was able to do a great deal more than it had to do in this trial. The bite on the road is something marvelous, and the easy way in which it floated along on its soft and elastic tires was very curious. When riding on the road steamer the feeling is like what would be experienced in driving over a smooth soft grass lawn. There is absolutely no jarring at all. Thus the machinery is spared the severe trials arising from the blows and jolts to which it is subjected when mounted on common wheels. There is, incredible as it may appear, no appearance of wear on the india-rubber tires. The original surface which the rubber had when it left the manufactory is still visible.

"The steamer which was the subject of the experiments had another speciality beside the wheels. It was fitted with a vertical boiler, which is one of the most economical steam generators yet produced.

"The tractive powers of the machine have surpassed all expectation. It was constructed to drag an omnibus, weighing, with its load of say thirty passengers, about four tuns, on a level road, but its powers are so greatly in excess of this task, that no load yet placed behind it has fully tested its power. An opportunity was offered which was confidently expected would show the limits of its capabilities. A huge steam boiler, weighing with its truck between twelve and thirteen tuns, had to be dragged up a hill rising 1 in 12. The little road steamer was chained to the truck, and steadily drew the great boiler to the top of the hill, the india-rubber wheels biting the ground in the most perfect manner; there was not the least sign of slipping. The boiler was drawn from the works of Messrs Hawthorn & Co. along the Junction road, and then up the hilly Bonnington road, to the flour mills of Messrs. Gibson & Walker. In its progress the road steamer had to draw its great load over all kinds of road. Nothing seemed to effect the bite of the india-rubber tires. The road was so slippery from the frost that horses had the greatest difficulty in keeping on their legs, but no difficulty was found in going over the glazed surface with the india-rubber wheels. India-rubber does not slip even on ice, as may be easily ascertained by trying to slide in a pair of india-rubber goloshes."

The Celebrated Cashmere Shawls.

Finest of all woolen textures and most exquisite in workmanship is the Indian shawl. Uniting richness of design with freshness of coloring, it has no rival in the world. It is not only the most splendid tissue ever wrought by the hand of man, but it is also the most solid and durable, whether it adorns the shoulders of a modern belle or the waist of an Eastern potentate.

The Vale of Cashmere, where roses ever bloom, is the seat of this manufacture. The Cashmere shawl is woven by hand from the finest wool grown in Thibet. The wool is first spun and then dyed. It is then woven in segments which are afterward joined so skillfully as to leave no trace of the seam visible. The flowers are then worked in by hand, after which the shawl is cleaned and covered with a strong size, made principally of rice, when it is ready for market.

Shawls were formerly made in pairs, but since European dealers have invaded Cashmere more than two are made from the same pattern.

If destined for Europe, the shawl has to be disencumbered of its provisional dressing. For this purpose it is washed in the river flowing from the Lake of Cashmere, whose waters are reputed to preserve the colors, a property attributed to the aromatic plants growing on its banks. A sheet of paper is laid between each fold of the shawl. It is enclosed in four or five envelopes, and packed with the utmost precaution.

So delicate and complicated a work can only be accomplished by workmen versed in it from infancy, and who, living upon a handful of rice, are satisfied with moderate wages

The best workmen scarcely earn more than from three to four cents a day. The low price of labor will always render Europe tributary to Asia for this luxurious production. A shawl which costs $400 at Cashmere, or at Umritsur, in the Punjaub, where these shawls are also fabricated, could not be made for less than $5,000 to $6 500 by European workmen. The material only enters into twenty per cent of the cost. Hence many French manufacturers have formed establishments at Cashmere and Umritsur, where shawls are made by native workmen; but in too many instances they have introduced their own designs, which have changed the national character of the shawl, and often in these cases the beautiful tissue is concealed beneath a mass of embroidery.

Shawls of inferior quality are also made at Loodiana where this industry was introduced by a colony from Cashmere, recruited every year from the valley. The colors of those made at Loodiana are very solid, and bear constant washing. They are wanting in brilliancy of tints, consisting principally of brown, black, dark bottle-green, and indigo blue. The colors most prized are a dull yellow, shades of amaranth, and, most brilliant of all, a kind of rose pomegranate of the finest thread, used only in shawls of the finest quality. The favorite color in India is a bright copper green; it fades, but is very brilliant and costly, and is chiefly employed where palms are introduced into the design. Another shade of the same color is used for the warp of the finest shawls, as is also turquoise blue, a most costly color.

At Loodiana the workmen are seated three together at the same strip, in front of a cylinder upon which the warp is rolled. Each has at least fifty shuttles. The chief sits in the middle and guides the other two. In one pair of shawls is six hundred days' work; they would cost at Loodiana, if of the finest quality made, about $100. The white shawls with green palms are the coarsest.

These Loodiana shawls are heavy, the palms stiff and ungraceful, and they are destitute of the softness so admired in Europe; of this they gain in a great degree by wear and washing. From their cheapness Cashmere cannot contend with Loodiana in the Indian market. What the Indian produces by years of manual labor, the European now obtains in a short time by means of machinery. Shawls are made in the Jacquard loom by workmanship, the most intricate and complicated.

An attempt has been made to imitate these shawls in France, but the perfect softness of the Indian shawl has never yet been equaled.

Another great merit of the Indian *cachemire* consists in the harmony and effect produced from the proper distribution of color and the rich invention of their patterns; these give them an evident superiority over the French shawls, which last are chiefly distinguished by their well chosen designs and the perfect regularity of their weaving, equally apparent both in the ground and border. The Cashmere wool is the most delicate and difficult of all tissues to work, so that the Eastern natives, by their success in weaving it, have earned the reputation of being the most patient and most skillful weavers in the world.

The Effect of the Recent Earthquake upon the Waters of the Pacific.

A hypercritical editor, hailing from the city of brotherly love, says: "The illiterate press have found a new word, and pleased as a child with a new toy, are using it on all possible occasions. 'Tidal wave' is the latest lingual plaything, and inaccurate journals and journalists are flinging it about with a childish disregard of its meaning or proportions. The great earthquake of South America comes, we are told, of the tidal wave. Now, a tidal wave, as any one can see by looking into his dictionary, is a regular and periodical swell, not a volcanic or otherwise exceptional upheaving. At Cape May we use them to bathe in. The very root of 'tide' is a Saxon word signifying time. The South American convulsion was just *not* a tidal wave, and that was exactly where the trouble arose." Had this editor consulted his dictionary further, he would have discovered that the word tide has been used by good authority as meaning a strong confluence without regard to regularity of interval. This meaning, although pronounced obsolete, has nevertheless been much used by modern writers; and, in lieu of anything better, we shall continue so to use it, notwithstanding we are aware "that the schoolmaster is abroad again."

A constant attendant of earthquake shocks, the tidal wave produced by them has always been a subject of interest. The production of such a wave is easily explained. The mean level of the bottom of a body of water being suddenly changed, such a wave is an inevitable consequence. The waters rush with overwhelming force into mouths of rivers, harbors, and bays, sweeping ships and floating docks from their moorings, and often flooding whole tracts of country lying many feet above the ordinary high water mark. The recent earthquake in Peru was accompanied by a tidal wave of immense volume and extent. The entire western coast of South America, the Sandwich Islands, and Southern California, four thousand miles north of the great center of convulsion, received the force of this wave. In Peru, the wave swept into the ports with overwhelming violence, adding enormously to the ravages of the shock previously experienced. At Talachuana, on the southern coast of Chili, about six hours subsequent to the disaster in Peru, the wave swept into the bay, having traveled a distance of 1,400 miles. This town was almost entirely submerged, and great damage was done to the shipping, principally whalers.

A letter from a Mr. Hewitt, to the Los Angelos *Star*, describes the phenomenon as it appeared on the morning of the the 14th, at about seven o'clock (about fourteen hours after the occurrence of the central shock), at Wilmington, in Southern California:

"The tide was observed to be running in with unusual velocity for about fifteen minutes, and then to suddenly turn and run out for about the same length of time, with the same unexampled rapidity. It is now 9 o'clock in the evening, and the same running in and running out, at intervals of from 15 to 25 minutes for each direction, has been going on since it was first observed this morning. Captain Polhamus, of the steamer *Cricket*, informs me that in crossing the bar to-day he observed the water fall five feet in eight minutes, and to immediately rise the same number of feet in the same space of time. Another unexplainable peculiarity of this never-before-heard-of tidal freak is that the water from the sea would run upon one side of the channel, and *down* the other side at the same time."

The wave was also felt at other points along the Pacific coast, which may be inferred from what we have already said about it. The most striking peculiarity attending these waves is the rapidity with which they travel, which will leave little room for surprise at their great force and destructive energy.

Whence the Material for False Head-dresses Comes.

M. Pierre Véron supplies some interesting, if not in all respects satisfactory and comforting information concerning the origin of some of the head-dresses worn by the fashionable of the day. It seems that long hair is expensive, costing as much as 110f. a pound; short hair is to be had at from 18f. to 35f. One of the principal dealers in human tresses has a house in Paris, five stories high, entirely to himself, and last year he did business to the amount of 1,233,000f. The capillary *razzias* executed among the peasantry no longer suffice to meet the enormous demand; and—well, there is no use adopting a round-about way of stating the matter—the hair cut off the heads of dead persons in the hospitals comes in very useful, but still insufficient. So importations are had recourse to. Fair hair is bought from certain German provinces. Whole cargoes of black hair is received from South America, "while," says our author, "we expect immense quantities of hair made up into head-dresses to North America." The dearest hair is the completely white. It is hardly to be found long enough, and a chemist has undertaken a series of experiments to take the color out of dark hair. He has got as far as mottled gray, but the true white has yet to be discovered. We have recently seen a statement to the effect that the Comanches and Apaches—the wild, savage Indians of the northern provinces of Mexico and New Mexico—have sold scalps of their tortured and murdered victims to the agents of the hair manufacturers.

THE EARLY FROSTS.—In Scranton, Pennsylvania, the mercury fell to 31° on the morning of the 18th instant. The same date brought a frost to the vicinity of Richmond, Va., Chicago, Buffalo, Boston, Hartford, Providence, R. I., and Lewiston, Me. Ice is said to have formed at Providence R. I., and Coatesville, Pa. Snow is reported to have fallen near Montreal, and still more surprising, in Robinson and Richmond counties, Va.

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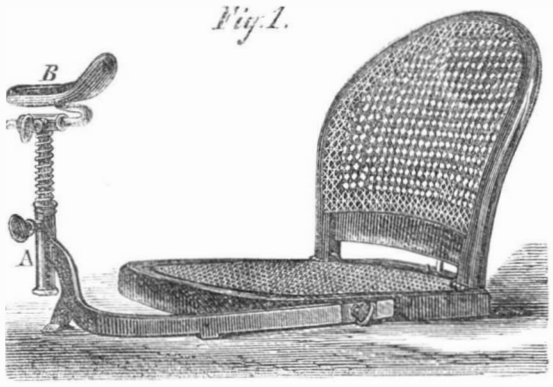
NEUHAUS' TAILOR'S REST AND SEAT.

The cramped position of the legs seen in tailor's at their work and in the posture assumed by Orientals, is so far unnatural that it requires constant practice to make it tolerable; yet it is considered to be the most convenient for the work of the tailor. To relieve the constraint upon the lower limbs and afford a support for the spine in the case of tailors, the device shown in the accompanying engravings is contrived.

Fig. 1.



It is a legless chair, with seat and back, to be placed upon a bench or table; the back being hinged to the seat and made adjustable by means of a screw in the rear, so that the angle of inclination of the back may be suited to the conformation of the workman and the work to be done. In addition, there is attached to the side of the seat a bar, having at the other end a standard and socket, A, for the reception of a leg rest, or saddle, B, with its shank, which may be raised or lowered, and secured in position by means of a thumb screw. This upright shank has a horizontal socket on its upper end, in

Fig. 2.

which the leg rest is adjusted. The weight of the leg is sustained by a spiral spring encircling the upright of the leg rest. The bar to which the supporting device is attached may be contracted or extended by means of a slot in the bar and a screw attached to the chair seat.

With this device there can be no cramping, and the position of the workman may be made perfectly easy and comfortable, and be changed at will. Patented through the Scientific American Patent Agency, June 2d and August 11th, 1868, by Frederic Neuhaus, who may be addressed, Box 148 Belleville, Ill.

Oriental Newspapers.

There are now lying before us two papers such as have rarely or never before lain on any other editorial table in this country, if in the world. One of them is the venerable official *Pekin Gazette*, that has been published for a thousand years, the first number of which was probably an exact counterpart of all its successors. The other is a number of a Japanese fortnightly issued on the arrival of each American steamship at Rokohama. It has been published about eighteen months, and is sold for ten cents a copy.

The Chinese paper covers ten pages, each four inches wide by ten long, and has yellow paper covers, on which are printed its name and date in black and crimson inks. It is the only native paper for a population of 414,000,000 souls, who have for centuries been in some degree of contact with European influences, and who have a literature that is vaster in its dimensions than that of any other people. It is exclusively confined to official notices. The other is one of two papers started in Japan since that empire was opened by Commodore Perry's expedition. It covers 34 pages octavo, and is illustrated. Like the Chinese the leaves are uncut, and are printed on but one side. It is called the *Newspaper of the World*. Instead of being confined to a barren record of official proceedings, it treats of agriculture, horticulture, navigation, and the building of ships; the politics and condition of other countries, literature and general news for about 40,000,000 people. It contains a cut of the European horse and dog, a small picture of a British steam gunboat, another of a somewhat similar craft, and a remarkably well executed representation covering a whole half page, of the American Pacific mail steamship Great Republic. There is also a diagram that may be geographical, or satirical, or may describe the method of cutting a carcass of mutton. The pages are not numbered. Some are covered with undivided prints. Some are divided into unequal columns by lines. Some have great blacks of matter injected into the heart of the page.

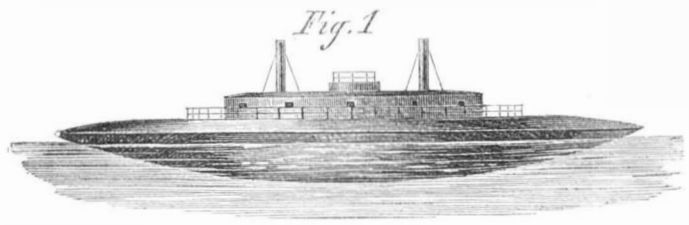
The first impression obtained from these two papers is naturally one of gratified curiosity. But there is really more meat to them. They are representatives of the condition and prospects of two empires with which we have recently come contact. The Chinese, slow and proud and conservative, have made no progress in a thousand years. The Japanese, prompt, enterprising, and anxious for improvement, begin with movable type that they have themselves cast, and employ twenty times the amount of matter used by the Chinese. —*Philadelphia North American.*

CIRCULAR FLOATING BATTERIES AND ARMORED WAR VESSELS.

The idea of constructing floating batteries of a circular form is not new, but the plan of making them offensive engines as well as defensive is quite modern. Among the plans of Napoleon the Great, for invading England, were circular floating forts propelled by sails and windmills, capable of conveying an army, respectable in numbers, with all its necessary provisions, etc. But the idea has never been tested in practical use.

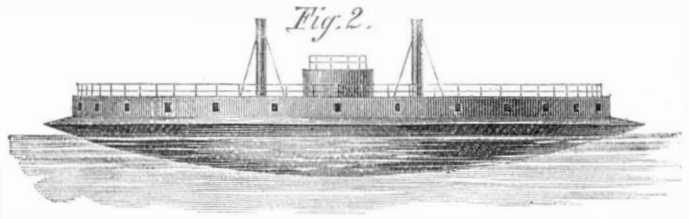
We copy from the *London Artizan*, three of a series of engravings, intended to show several adaptations of the idea of circular armored vessels, proposed by Mr. John Elder, of the firm of Elder & Co., Glasgow, Scotland. One of our San Francisco, Cal., exchanges, however, copies a letter from a Mr. Rutter, who shows that some years ago he proposed a simi-

Fig. 1



lar plan and tested it by models, copies of which, with descriptions, etc., were sent to the British Minister of Foreign Affairs at Valparaiso, to President Johnson, at Washington, and the Emperor, Napoleon III., at Paris. But whoever may be entitled to the credit of the original proposition, the plan seems to be capable of being made useful under certain circumstances. The hull of a ship built on Mr. Elder's plan, as illustrated by his models, would be somewhat similar in shape to a saucer with a flat covering, or to a small section of an orange, the rind of which would represent the skin of the vessel. Mr. Elder stated that a ship of this shape would draw only about half the water which would constitute the draft of an ordinary shaped vessel of equal displacement, though the midship section would of course be much greater. At first sight it might appear impracticable to drive a vessel so constructed through the water at any considerable speed, but

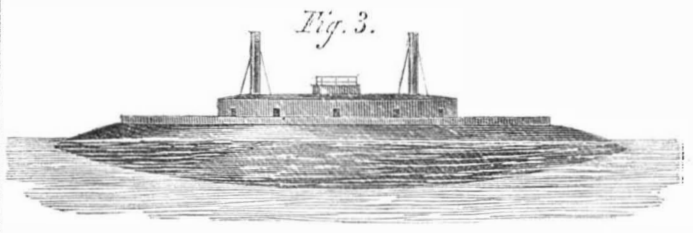
Fig. 2.



his own experience, he said, had afforded ample evidence that such a belief was erroneous. He had made two models—one of an ironclad of the most modern design, and another of a vessel built according to the plan he was advocating—and he had found, after repeated experiments in smooth and rough water, that the circular model required no more power to propel it than the other.

It was proposed for the purpose of propulsion to employ hydraulic machinery in vessels built on the circular system, similar to that used in Her Majesty's ship, *Waterwitch*—the suction pipe and water jet being in a line with each other, and it was estimated that there would be no difficulty in obtaining a speed of twelve knots an hour, if, indeed, the circular vessels would not attain to a speed commensurate with that of our fastest ironclads. The machinery for maneuvering the vessel was also very ingenious. On each side of the suc-

Fig. 3.



tion pipe and of the delivery pipe or water jet two other pipes were placed, curved at their outer ends in opposite directions, and through these the water might be taken in and given out instead of being received and delivered through the straight pipes referred to. By this means the vessel might be made to revolve in any direction, and the several guns, which were placed at frequent intervals round the vessel, could each in its turn be brought to bear on the same spot.

His method of steering is by means of a centrifugal pump, or, rather, turbine, revolving by means of a shaft, carrying at one end a pinion driving the wheel and at the other end a pinion revolving the pilot house. When the turbine revolves the pilot house is turned. By having a "look out," on line of sight, in the pilot house, corresponding with the suction pipe of the turbine, the person in the pilot house, while steering the ship, would have his back to the water jet, and would "look out" in a line with the suction. The ship would thus be caused always to travel in the corresponding direction, or, in other words, the steersman would only have to continue looking at any particular place in order to direct his vessel toward it as a destination. Double screws would seem to be applicable to the propulsion and steering of these vessels as well as the hydraulic plan of the *Waterwitch*.

From the peculiar shape of the hull, the sides forming a very acute angle with the horizon, the plating required would not be heavy. The lightness of draft is a great recommendation for its use as a movable harbor defense. The facility with which it may be turned is obvious; in fact, when required, it may be made to act as a floating revolving turret, being caused to rotate as fast as the guns can be fired. This power of rotation might also be employed when the vessel is required to act as a ram, somewhat in the fashion of a gigantic circular saw.

In the engravings, Fig. 1 represents the immersed portion, strengthened by a convex deck, the edge being above the surface, the vessel being intended for ramming as well as a powerful floating battery, the turret being pierced for a number of guns. Fig. 2 shows the battery extended nearly to the outside of the vessel with a raised pilot house in the center. Fig. 3 has the cutting edge of the vessel below the surface, but still carrying an offensive battery. Evidently this is intended mainly as a battery; for if driven through the water with sufficient speed to act as a ram its submergence, with its peculiar form, would tend to load the deck with water and diminish its buoyancy and speed. These are but a few of the modifications of form proposed by Mr. Elder; one is to have a vessel carrying a high tower in which, near the top, are mounted guns for firing over parapets, a marine adaptation of the land engines used in sieges centuries ago and employed by Titus in the reduction of Jerusalem. Mr. Rutter claims for his plan—in no essential different from Mr. Elder's—

1st. A perfect defense and protection, both of guns and men.

2d. Economy in the number of men required to work the vessel.

3d. Diminished weight of iron armor, and consequently of of relative cost to other vessels.

4th. A steady platform for the fire of guns, even in a sea way, combined with light draft of water.

5th. Impossibility of capture by boarding.

6th. Resistance offered to any attempt at destruction by rams or by running down.

7th. The small surface exposed to an enemy's fire as compared with the extent of an ordinary ship's broadside.

8th. The extraordinary capability of delivering her fire at all points of the compass at once, or of delivering a rapid and continuous succession of discharges on one point.

Petroleum Oil Test.

The general and prevailing opinion in regard to kerosene or refined petroleum oil is, that it must be of a high fire test to be safe, and to burn well; this is based on the fact that so many accidents have occurred by the use of kerosene or petroleum which have proved to be of a low fire test, and below the Government test which is considered safe.

We find by experiment that there is a certain point above which an increase of the fire test is detrimental to the burning qualities of this class of oil. All of these oils contain more or less of the paraffine or heavy oil which is not a burning oil, and the higher the test the less readily it will volatilize or feed through any of the ordinary kerosene wicks, and the more it contains of the heavy oil. This fact follows with all classes of distilled oils, from the heavy Canned and Albertine coal oil through Pennsylvania, and oil distilled from the heavy Western Virginia oil, no matter how highly purified, or at what point in distillation they are cut off, or what the color may be, there is a point below which it is not perfectly safe with the ordinary merchantable lamp, and a point above which its burning qualities are seriously injured. The point to arrive at is that which contains the least amount of paraffine that will consume with the other oil, and not wax, rosin, or burn on the wick or tube.

The color of the flame is also a guide and test; lower the fire test, white will be the light, and the light commences to shade to a yellow red till it reaches a point where the oil is so heavy with paraffine, or heavy oil, that the light or flame is dark, poor, and inferior. This important point, after careful tests and observations, we have established at 14° above the Government test, and 24° above what is considered safe merchantable oil, and between 110° Government test and 134° to 140° and to be 122° to 124° Fah. standard oil. For all ordinary uses a lower test is considered perfectly safe and in general use.

We copy the above useful information from F. S. Pease's Oil Circular, which can be obtained by addressing him at Buffalo, N. Y.

Heavy Locomotives.

Engineering says: There are good reasons for believing that as soon as steel rails shall have been generally substituted for iron, thereby permitting of weights of from seven to nine tuns per engine wheel, a much more powerful class of locomotives will be in request. The economy of working the heaviest goods trains is now well understood, and it is only the want of strength in the permanent way that limits the weight and power of six coupled engines to the existing standard. It would afford a good exercise to many young engineers to set about designing six-coupled engines of a weight of 50 tuns or thereabouts and having this weight equally distributed. The cylinders would require to be from 20 to 21 inches in diameter, for 2 feet stroke and 5 feet wheels and the boiler should not have less than 1800 square feet of surface, and 30 square feet of fire grate.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

For the Scientific American.

GAS EXPLOSIONS---THE SAFETY LAMP.

The Southbridge (Mass.) *Journal*, gives an account of the explosion of a gasometer, or rather gas holder, which occurred a few weeks ago at the gas works of the Hamilton Woolen Company at New Village, by which five lives were lost, which seems to furnish an opportunity for a few remarks on the subject of gas explosions, that may be useful. We copy the report of the disaster:

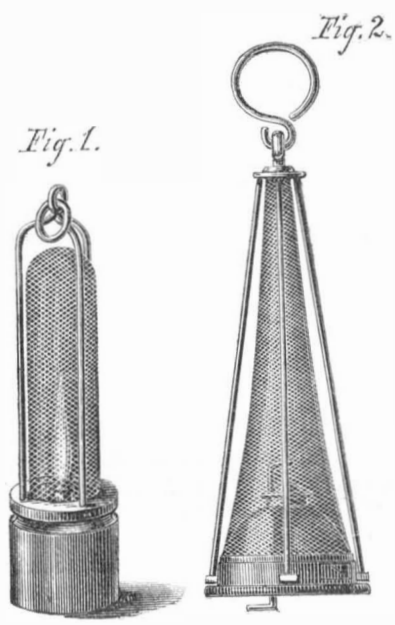
"No gas had been made since last spring, and there was but a small quantity on hand. The manhole in the top of the gasometer had been open five days to allow this to escape. Repairs were being made, under the superintendence of Mr. White, master machinist for the Hamilton Woolen Company, and all Saturday he was engaged with a force of men pumping the water out of the tank. During the progress of the work, he was frequently reminded of the danger from igniting the gas, and on one occasion when he suggested that a light might be used, the superintendent of the mill expressed himself plainly in regard to its impropriety. The work was not quite finished Saturday afternoon, and being desirous to begin the work of repairing on Monday, Mr. White had his employés come back after tea. The work went on till half-past eight o'clock in the evening, when, without any warning to the half dozen people who were in the building which covered the gasometer, he took a lighted lantern and lowered it by a cord into the pit, apparently to examine its condition, when the explosion occurred with considerable force, blowing the house and gasometer some twenty feet into the air, and shrouding the whole in a sheet of fierce flame. Mr. White, who was directly over the manhole, was thrown upward with much violence against the roof, crushing in the top of his head, and then fell with the burning mass into the pit or tank of the gasometer, where the fire raged with the most violence. Those who were inside the building when it rose in the air, were blown literally out of the building, followed by a terrific rush of flame. John Brown and James Brogan fell near the building. Brogan was terribly burned and lived but a little while after being taken out of the ruins. Brown had his head, side, and arms, terribly burned and crushed, and died after about three hours of suffering. Rochelle was severely burned and died the following Wednesday. Devoy, the last victim, died Thursday. Clemence and Holmes fell still further from the building, near the bank of the river, retaining their senses, and as soon as they felt the rush of flame, they jumped into the water, and thus saved their lives."

It is to be regretted we do not have a more particular account of this catastrophe; it would be well to know the capacity and form of the gas holder, and the point where the manhole was located. The usual shape of gas holders is cylindrical with a crowning top or roof, the manhole being generally near the perpendicular wall for convenience of introducing a ladder and leaning its top against the wall. The frame of the roof or crown is usually of iron bars, to which are riveted the plates of sheet iron of which the gas holder is built. In this case the manhole had been left open five days to allow the gas to escape, although, as no gas had been made for several months, the holder could not have been very heavily charged. Yet there was gas enough in it, notwithstanding these facts, to blow a building to pieces, kill five men, and start a destructive fire.

We think the cause of this accident—if so it may be termed—perfectly plain to be seen. Gas is lighter than air, and will seek the highest point. Assuming (which was probably the case) that the manhole was near the outer edge of the roof, and below the highest part of the holder, its being open five days, or five months, would not free the holder of that portion held in the upper part; the gas could no more run down to the manhole than water can run up hill. If there were no leaks in the higher parts of the roof, the gas would have been retained there in its integrity for years. There was gas—hydrogen—mixed with sufficient quantity of atmospheric air—oxygen—to constitute a highly explosive mixture, requiring only a flame to ignite, and that was supplied by the lantern. Consequence, a terrific explosion.

Now, what should Mr. White have done in this case? He might have detected the presence of gas in the crown of the holder by punching a small hole at the apex, and applying a lighted match over the hole. If hydrogen was there it would have escaped, and that portion escaping would have ignited as it mixed with the atmosphere; only the lower stratum in the holder could have been explosive. Or, the puncture would have been sufficient to permit the gas to escape. Perhaps several small holes would have been necessary to insure perfect safety, as the ribs of the roof, if meeting the sheet iron covering air tight, might form compartments, each being an independent gas holder. We would here suggest the formation of minute passages between these compartments in building gas holders, by simply cutting scores across the bars, next the sheet covering, and forming a safety hole with suitable covering, to be removed as occasion may require, located at the very top of the crown. Thus the holder could be readily and entirely discharged of its gas.

The Davy lamp is also useful at gas works, as well as in mines, and it is so cheap and easily constructed that it is matter of wonder it is not more generally used. To enable our readers to construct one for temporary purposes, we have engraved two illustrations; one, Fig. 1, of the original Davy lamp, and the other, Fig. 2, of the Struve lamp, considered preferable to the Davy, and easier made. No description is necessary to enable the reader to understand their construction. The lamp, gauze cylinder, and all, should be about 9 inches high, 3 inches diameter at the base, and 1½ inches at the top. The sides and top should be formed of wire gauze, 700 or 800 meshes to the square inch. The edges of the cylinder must be soldered securely together along the side. At the bottom a band of sheet metal should be soldered, which should meet the body of the lamp, and be made so as to be removed for lighting and trimming, and held securely in place when in use.



It frequently happens that in buildings furnished with gas, the pipes, stop-cocks, or meter leak. The escaping gas, mixing with the air, becomes explosive, and if confined in a room a lighted match or lamp produces an explosion destructive to life and property. When gas is found in an apartment the doors and windows should be opened, the latter from the top if possible, but if not made to let down, defend the hand with a hat or any other covering and become a glass breaker, smashing out a few of the upper panes. Allow half an hour to elapse, then bring in an uncovered light, *carrying it near the floor*, and do not approach the source of the leak with it. The Davy or Struve lamp, however, is the safest.

Fortunately these explosions are not very frequent. Yet sometimes men, who ought to know better, commit the most egregrious mistakes. As an instance, a civil engineer in Boston, some years since, found the basement of his house filled with gas, and carrying a lighted lamp above his head, and accompanied by his wife, he approached the meter, when an explosion took place that broke his legs, burned him and his wife, and cracked the walls of his house. Another case was that of a graduate of West Point, who was superintending some work on a gas holder which had been found defective. The manhole in this case was near the side wall; and to see the interior he introduced a lighted match, when an explosion occurred that severely injured him and others, and did great damage to buildings in the immediate vicinity.

New York city. F. W. BACON.

Pressure on Steam Valves.

MESSRS. EDITORS:—In your issue of September 9th, in answer to a correspondent, you say, "The pressure upon a closely fitted steam valve, not covering any ports, is as the area of the valve and the pressure of the steam." As this statement is calculated to mislead many youthful engineers and mechanics, I would state that the friction of one smooth surface moving upon another, is no greater under any pressure of steam, no matter how great, than in a vacuum, or in the open air; and it appears singular to me that the reason for the phenomenon in question, if it be a phenomenon, should have been so generally overlooked, for it is evident, beyond the possibility of a doubt, that the action of steam and that of air must be identical with respect to their penetration between two apparently smooth surfaces; for mathematically speaking, there cannot perhaps be such a thing as a smooth surface of measurable extent. It therefore naturally follows that the steam insinuates itself between the two surfaces, and it will then press upward with precisely the same force that it presses downward.

The fact that steam insinuates itself between the piston packing and the bore of the cylinder, even when both are in perfect order, and condenses in the interstices often sufficiently for all purposes of lubrication, is one among many proofs of the penetrating powers of steam.

If the above statement is not considered satisfactory to your correspondent, I would recommend him to take a slide valve of the ordinary pattern, and having scraped it to a good bearing, place it on a well fitted seat (without ports) inclosed in a chest, and apply steam of any pressure, say one hundred and fifty pounds to the square inch, and he will be convinced as others have been.

Knowing that your journal has a large circulation among mechanics, and that you would not willingly propagate an error, must be my excuse for trespassing on your valuable space. H. M.

[Our correspondent evidently does not mean the same thing by a closely fitted steam valve that we do. We mean by a closely fitted steam valve, one that is steam tight. Our correspondent seems to think that this is impossible. That such perfection is not often reached is, perhaps, true; but that it can be, and is obtained, is the opinion of some of our best engineers. Whether it ever is attained or not, the only basis for computation of the pressure a valve sustains is to assume that it is perfectly steam tight, as no one would pretend that it would be held to its seat if it lay, not upon the seat, but upon a stratum of steam.—EDS.

Coating Brass with Copper---Blowing Hot and Cold.

MESSRS. EDITORS:—Take a piece of brass, dip it in a solution of sulphate of copper, no deposit of copper will cover the brass, as the brass has no affinity for the copper, and will not separate it from the solution. But as soon as you dip the brass in the solution, you lay a piece of saw blade (steel) on it, a beautiful coating of copper will cover the brass, iron, or any other kind of steel will not produce the same results.

The extremes of heat and cold can be produced in a very simple manner. If you open your mouth wide and blow your breath, it is warm—producing heat—as you warm your cold fingers in this way. Pucker your mouth—make a small orifice—force out the breath, and it is cold—producing cold. You cool your fingers by this method when you burn them. Please explain the above phenomena, and oblige,

T. W. B.

Covington, Ky.

[The reason that, when a piece of steel is placed in contact with the brass, in a solution of sulphate of copper, the copper solution is decomposed, and its copper deposited upon the brass, is that the chemical action of the solution upon the steel renders it electro-positive, while the brass is rendered electro-negative. The copper in the solution being the electro-positive element, will be attracted to the negative pole. We think our correspondent is in error about any particular kind of steel being necessary, and that his statement to that effect is based upon defects in his method of experimenting, which of course we can not point out without personal observation.

The explanation of the second statement in his communication is, that heat and cold are merely relative terms. If he should blow upon a piece of iron colder than his breath, it would be warmed; and if the same thing should be done to a piece of iron heated to a temperature above that of the breath, it would be cooled. The sensation of cold is felt in any part of the body when it has less heat than the general temperature. The breath which is heated to a temperature nearly or quite as high as the vital parts of the body, will of course impart its heat to the extremities when they are cold. When a part of the body is burned, its heat is raised by inflamatory action above the general normal temperature. The breath would then feel cool when blown upon the burn.

When the breath is forced in a sharp current, it carries with it much of the cooler air which surrounds it, becoming intermixed with it by friction. When it is gently blown from the mouth, this effect is not produced. Try the experiment by blowing the air gently, with your mouth "puckered," and then without changing the position of the lips, blow forcibly; you will, when blowing gently, experience a feeling of heat, and when you blow forcibly, a sensation of cold will be produced, so you will see the shape or the size of the orifice has nothing to do with it.—EDS.

Flux for Blowpipe Analysis.

MESSRS. EDITORS:—Among the various methods of testing the presence of substances in chemical examinations, that by means of colored flames seems to be of growing importance, not alone with reference to the application of the spectroscope, but in the ordinary use of the blowpipe or gas flame. For unmasking lithia, etc, the books prescribe a mixture of bi-sulphate of potash and fluor spar; but this flux is objectionable, on account of the intense violet tint (potash) which may disguise the reaction due to the presence of small quantities of other substances. Fresenius directs that silicates be mixed with sulphate of lime; but this salt is, by itself, infusible, and its power of decomposing the natural silicates small. On the other hand, a mixture of sulphate of lime and fluor spar, in equivalent preparations (say about two parts of crystallized selenite to one of fluor spar finely mixed), forms an easily fusible bead, which by itself gives only a very faint dull red tint (lime) to the flame, but which renders the presence of such elements as give color, most beautifully evident and characteristic.

Thus, small portions of lepidolite, petalite, etc., mixed with this flux, impart the fine carmine tint; copper, strontium, their well known colors, especially after continued blowing. Potash and soda minerals (feldspar and albite) are at once distinguished.

Presuming that many of your readers are interested in Determinative Mineralogy, I invite them to make use of the above named reagent, and if possible extend its utility.

Lynn, Mass. STEPHEN D. POOLE.

[We have no doubt the flux described by our correspondent will prove a good one, and recommend its trial.—EDS.

Burying Alive.

MESSRS. EDITORS:—In your issue of Sept. 16th there is an article on "Burying Alive;" and in the list of patents from time to time appear devices and compounds for preserving the remains of deceased persons; and particularly I noticed last week a patented coffin which, in the language of the specification, is "rendered air tight," etc.

In regard to the "burying alive" detecter, experimented upon in Newark, N. J., there is manifested a want of practical knowledge with regard to signs of death, and of the real cases that have taken place in the experience of cemetery life. The writer of this article has seen at least fifty thousand interments made in one of the large cemeteries on Long Island, but never witnessed any want of this invention,

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though I have known cases of watching the receiving vault, and leaving the coffin open, etc., in many instances. I have also seen an instance that would have startled the watchman had he fastened wires, as at Munich, to the hands and feet; for I have known the limb of a crooked-kneed person, deceased, whose remains were crowded to fit the coffin at the knee, to be drawn up by the contraction of the muscles, so as to force the lid of the coffin and hang out at the side. As regards the prejudice and strange stories about being buried alive, and evidences deduced from the fact of remains found with face downward, etc., there is great talk, with little facts. But I have seen a caving in of a grave, or a slipping off of one of the ropes when lowering into the grave, cause the complete turning upside down of the coffin, which would no doubt change the position of the corpse. An incident like this would be forgotten when, years after, the body might be exhumed. Another point about this "burying alive" detector. "A tube at the head" connects the corpse with the surface above! Indeed! Let the practical(?) inventor of this "detecter" go to Greenwood. Imagine "a tube" from the remains of every corpse to the surface above, and this ridiculous impracticable device will appear in the shape of vent holes for the unpleasant gases arising from the decaying bodies below, or, in fact, preventing the need of burying at all!

Another point about patent coffins, etc. If these inventors will go to any large cemetery and witness the styles of coffins used, they will seldom, if ever, of late, see a "metallic case"—a patented coffin, once very popular, but now in the shade. It is used for disinterment now and then, but out of a thousand interments not more than one of two cases of metallic will be seen. And yet inventors are making air-tight coffins in different ways, and all will fail, for the same reason as the metallic case. I wonder often if these inventors, or people generally, know the effect a metallic case has upon a corpse. Do they know that in a short time decomposition is so active that the generated gases and fluids, if not allowed to escape, will aid this decomposition? I have seen the remains of a noted lady that were removed from Chicago to Long Island, so decomposed that they would actually flow, jelly-like, from one end to the other of the case! Will any one dispute that this fluid aided decomposition? Being air tight, the case holds that which rots the flesh and bones. Plain facts and plain language.

Let me close by remarking that the pine box, which undertakers urge more for an item to make profit on than for utility, is also an error that the public generally are not aware of. I care not for theories of decomposition and preservation, I speak from experience in seeing thousands buried and taken up. The pine boxes, from moisture without and within, soon become tight. They retain the decomposed matter oozing from the coffin, and this soon rots the wood of the coffin, and, instead of preserving the coffin, acts to the contrary.

A common pine coffin, with loose joints, or small apertures above for gases and below for fluids, is better than all your patents.

N. F. PALMER,
Superintendent of Cedar Lawn Cemetery,
Late of Cypress Hills, L. I.

Paterson, N. J.

Nitro-Glycerin and Boiler Explosions.

MESSRS. EDITORS:—I inclose a communication to our daily paper as an explanation of the cause of our many frightful explosions. I am an old, western, high pressure engineer, and the causes of nearly all, if not all, the boiler explosions I have always thought to be low water, over pressure, and carelessness on the part of the engineer. I have carried over pressure of steam on a set of boilers for months at a time, but with always plenty of water, and exercised careful watching, never relying on the water and steam gage alone, but always using the safety valve and gage cocks, the same as though the water and steam gage were not attached, yet never met with any boiler accident; although in two instances the same set of boilers exploded under the care of other engineers. Was it carelessness, or was it from this agent "Phosphorus" speaks of. For my part I have always adhered to your idea of explosions, and shall continue to do so until some better reason for them is given than that of the inclosed.

GEO. WHIPPLE.

Burlington, Iowa.

[We give the communication to which our correspondent refers as a curiosity.]

NITRO-GLYCERIN CONSIDERED AS A CAUSE OF STEAM BOILER EXPLOSIONS.

1st. Water containing animal fats or oils, subjected to a high pressure of steam, the fats or oils act chemically on the steam, forming fatty acids and glycerin.

2d. Organic matter present in water used for steam, the chemical affinities will set free electricity, which generates ammonia NH_3, ammonia mixed with moist air at a temperature 212° F. over water containing potash, produces the nitrate of potash, KO,NO_5,

3d. Glycerin and nitric acid, readily combine chemically, the glycerin gives up a portion of its hydrogen and takes on a part of the oxygen, when they all combine into a new compound, nitro-glycerin, which has two and one-half times the specific gravity of water.

Nobel's blastingoil is composed of glycerin, sulphuric acid, and the nitrate of potash.

4th. Nitro-glycerin being insoluble in water, and having a greater specific gravity, it readily finds the bottom of the boiler, where it would remain were it not for the sudden rise of temperature. It is not explosive at 212° Fah., but at 360 Fah. (which it soon attains in contact with the boiler plate), explodes with thirteen times the force of gunpowder. Hence those terrific and unaccountable explosions that so often take place under the eye and care of our best engineers, when the boiler contains its maximum of water, and frequently at a low or medium gage of steam.

5th. Now when we take into consideration that at least ninety per cent. of all those terrific and heart-rending marine disasters on our western rivers for the past thirty years, commencing with the ill-fated steamer *Mozelle* in 1838, and ending with the *Harry Dean* and *Magnolia*, in 1853, have occurred in the spring of the year when the rivers were full of surface water containing organic matter, fats or oils, potash, and sulphur; or that they blew up at or near the levee of some city, where they had taken on a supply of water contaminated with sewerage, containing the very elements of destruction; we are led to the logical and scientific conclusion that here is the cause of those terrific and unaccountable explosions. That under certain circumstances all the elements for the production of this compound may get into a steam boiler, and that 212° Fah. is favorable to chemical action, even to the formation and deposit of a solid stone upon the inside of a boiler no one can deny.

PHOSPHORUS.

[We have no disposition to treat this hypothesis seriously; we would only suggest that "Phosphorus" need not have imagined impossibilities to arrive at his nitro-glycerin theory, as gunpowder would have answered his purpose quite as well. Gunpowder is composed of carbon, sulphur, and niter. All waters contain more or less organic matters, held mechanically suspended or in solution, and these are partly composed of carbonaceous substances and potash. Here we have two ingredients for our gunpowder—the charcoal and niter—and the decay or decomposition of these organic substances, continually going on, will furnish sulphurreted hydrogen gas which contains the only other ingredient required. As to the relative proportions, we cannot see why they cannot accidentally combine to form gunpowder as our "Phosphorus" elements can to form nitro-glycerin. "Phosphorus" is highly inflammable when exposed to the air. It should be kept tightly bottled; and we would suggest that if this writer intends to construct these explosive theories on any extended scale he had better imitate the substance whose name he wears and not air his ideas too freely.—EDS.

Manufacture of Pins.

A correspondent of the New York *Evening Post*, gives the following graphic account of the manufacture of pins as it is now conducted:

The pin machine is one of the closest approaches that mechanics have made to the dexterity of the human hand. A small machine, about the size of a ladies' sewing machine, only stronger stands before you. On the back side a light belt descends from the long shaft at the ceiling that drives all the machines, ranged in rows on the floor. On the left side of our machine hangs on a peg a small reel of wire, that has been straightened by running through a compound system of small rollers.

This wire descends and the end of it enters the machine. This is the food consumed by this snappish, voracious little dwarf. He pulls it in and bites it off by inches, incessantly, one hundred and forty bites to the minute. Just as he seizes each bite a saucy little hammer, with a concave face, hits the end of the wire three taps and "upsets" it to a head, while he gripes it in a counter-sunk hole, between his teeth. With an outward thrust of his tongue he then lays the pin sidewise in a little groove across the rim of a small wheel that slowly revolves just under his nose. By the external pressure of a stationary hoop these pins roll in their places, as they are carried under two series of small files, three in each. These files grow finer toward the end of the series. They lie at a slight inclination on the points of the pins, and by a series of cams, levers, and springs are made to play "like lightning." Thus, the pins are pointed and dropped in a little shower into a box. Twenty eight pounds of pins is a day's work for one of these jerking little automatons. Forty machines on this floor make five hundred and sixty pounds of pins daily. These are then polished. Two very intelligent machines reject every crooked pin, even the slightest irregularity of form being detected.

Another automaton assorts half a dozen lengths in as many different boxes, all at once and unerringly, when a careless operator has mixed the contents of boxes form various machines. Lastly, a perfect genius of a machine hangs the pins by the head in an inclined platform through as many "slots" as there are pins in a row on the papers. These slots converge into the exact space spanning the length of a row. Under them runs the strip of pin paper. A hand-like part of the machine catches one pin from each of the slots as it falls, and by one movement sticks them all through two corrugated ridges in the paper, from which they are to be picked by taper fingers in boudoirs, and all sorts of human fingers in all sorts of human circumstances. Thus you have its genesis;

"Tall and slender, straight and thin,
Pretty, little, useful pin."

A beautiful Yankee trick was once exposed by these modern Yankee pins. A not over-scrupulous antiquarian was displaying the relics of the "Salem Witchcraft" to a wondering throng at a shilling a head. Among the relics was a saucer full, more or less, of pins taken from arms, stomachs, etc., of the bewitched victims. This was a chance for one of the astonished, who was a pinmaker. He gave a close squint at the pins, and opened his eyes very wide. "Do you say that these pins were taken from the unfortunate victims of witchcraft at Salem?" solemnly inquired the pin-man. "Of course they were; what do you ask that question for?" responded the showman. "Because I find one little obstacle to my faith in your story," rejoined the pin-man. "Solid-headed pins were not invented until two hundred years after the Salem witchcraft!" Moral—Showmen of relics should consult antiquarians and experts when "getting up" their stock.

Quicksilver Mines.

Quicksilver exists in quantities worthy of note only in Spain, California, and Peru. For a very long period the Almaden quicksilver mine in Spain was the only one known, and held a rigid monopoly of the trade. The discoveries in Peru opened a new field; but though it reduced the price for a time, it did not seriously affect it. The discovery in California threw such a quantity into the market that the whole quicksilver trade of the world is now ruled by it.

The great mine is at New Almaden, sixty miles south from San Francisco. The ore is taken from a mine in the hills the inside of the coast range of mountains, and is found in chambers instead of veins. The earthquake in October, 1865, which did so much damage to San Francisco, put money in the pockets of the New Almaden owners, as it opened up a new and very rich chamber not previously discovered. The cinnabar ore, from which the quicksilver is taken, is about the color of a well burned brick and looks, when piled up for use, much like a heap of broken and antiquated bricks. The ore is placed in furnaces, a wood fire is built beneath, and the quicksilver flies off in vapor, and is caught and condensed in air-tight rooms filled with water. After condensation it is bottled up in flasks containing seventy-six and a half pounds each, this being the same as the weight used at the Almaden mine in Spain.

This mine has been the subject of much litigation, as indeed has nearly everything valuable in California. It became the property of a stock company, under the management of Mr. Butterworth, of New York. The product in 1865 was 47,194 flasks, worth about $50 per flask, or a total value of $2,359 700. The cost of producing this result was about $800,000, leaving a very fair margin of profit. The ore averages from twelve to eighteen per cent of quicksilver, and frequently exceeds the latter figure. The ore is a deep red color, heavy like a lump of lead, and is said to contain about twenty per cent of quicksilver. A large quantity of quicksilver is used in gold and silver mining on that coast, and the balance goes to various parts of the world. Of the production of 1865, fourteen thousand flasks were sent to China, ten thousand to London, five thousand to Peru, two thousand to Chili, seven thousand to New York, two thousand to Mexico and two hundred to Australia.—*Boston Commercial Bulletin.*

Local Anesthesia.

We have always had our doubts that the local anesthesia produced by the spray of ether, was attributable to the partial or entire freezing of the parts to which it is applied as has been claimed. The *Medical Gazette* contains the following report of case in which ether was thus applied, which confirms our doubts:

"The subject of the experiment, a patient of Dr. Geo. H. Perine of this city, had some sixteen teeth extracted with scarcely any pain, and what little discomfort there was, he referred rather to the gum than to the dental nerves. Richardson's spray instrument was used, and the jet directed upon the external orifice of the ear and a little in front of it for between three and four minutes. One side was anesthetized first and a number of teeth and stumps on that side (upper and lower) extracted, and the same process repeated afterward on the opposite side. The central incisor of the side first operated on caused some pain, partly, perhaps, from subsidence of the anæsthetic action (that being the last tooth removed on that side), partly, possibly, from some inosculation of the terminal branches of the superior maxillary nerve of the opposite, undeadened side.

"Many physiologists hold that the anesthesia produced by the spray instrument is due, not to any specific effect of the agent employed, but simply to a "freezing process," the result of rapid evaporation. In this case, however, even the integument (though greatly reduced in temperature) was not *frozen*, and had it been, it would have been impossible for the mere action of cold to penetrate to the ganglion of Casser. The subcutaneous cellular tissue, fat (the worst possible conductor) muscular and fibrous layers, must surely protect the ganglion from very intense refrigeration, and, moreover, the insensibility of the dental nerves continued for some minutes after the skin had recovered its warmth at the spot where the spray had been applied.

"Dr. Perine has since used this process for the extraction of two or three other teeth, with very satisfactory results, and in one case of severe facial neuralgia succeeded by its means in giving instant (and strange to say, more than temporary) relief."

An Interesting Experiment.

Galignani says: "M. Trèves has made the following curious mechanical experiment: Two steel tuning forks brought to the same pitch were topped with small mirrors, and placed opposite to each other in two vertical planes at right angles. One of them, No. 1, was, moreover, surrounded with a strong coil of wire receiving an electric current from a nitric acid pile composed of four elements. A fiddlestick being now drawn across each of the tuning forks, the vibrations commenced, and immediately a perfectly motionless luminous circle was produced in the mirror of No. 2. But no sooner was No. 1 magnetized by the admission of the current, than the circle became an ellipse, and swayed to and fro, denoting the action of a new vibratory motion. As soon as the current ceased the figure became a fixed circle again. This experiment may serve to investigate the vibratory powers of iron and steel according to their composition and physical state."

WATER POWER OF MAINE.—The State of Maine has issued a report, entitled "The Water Power of Maine," in which detailed information is given respecting the location, characteristics, improvements, ownership, and other features of a considerable proportion of over 2,000 different water powers, representing in the aggregate from 300,000 to 600,000 horse power. It also recapitulates, in a brief manner, in a "Preliminary statement," the peculiarly favorable conditions, secured both by nature and by the liberal policy of the State, under which the water power can be employed. A copy of the Report will be sent, free of cost, to manufacturers and the employers of mechanical power, also to public libraries, upon application to Walter Wells, Superintendent Hydrographic Publication, Portland, Maine

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MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Pennsylvania oil wells turned out 12,235 barrels a day last month.

The Troy foundries are running at full blast, the demand for stoves being ahead of the supply.

It takes twelve thousand tuns of coal to supply the furnaces of the glass factories on the line of the West Jersey Railroad.

The rolling mills at Portland are manufacturing fifteen hundred tuns of rails for the Grand Trunk Railway.

The Washington Mill Company at Lawrence, Mass., is erecting a new mill for the manufacture of worsted goods. It will be two hundred feet long, seventy-five feet wide, and three stories high.

A train on the Wisconsin Division of the Chicago and Northwestern Railway, is reported to have recently run fifty-one miles in forty-nine minutes, and ninety-one miles in ninety-five minutes.

Over a million pounds of tobacco, on which the owners are unable to pay the taxes, are now stored in Richmond.

Flouring mills in Minneapolis and St. Anthony will turn out 180,000 barrels of flour in the next two months.

It is said that the New England Express Company will soon begin operations on the lines of the principal railways of the Northern States.

Philadelphia does a great business in the marble manufacture. It has sixty marble yards. The manufacturers employ a large number of sculptors and carvers, and the business is very active.

Both bituminous and anthracite coal have been found in the Rocky Mountains, on the line of the Pacific Railroad, close to the track. The best coal field is near Benton, in the vicinity of the crossing of the North Platte.

The mail agents on the Union Pacific Railroad have been armed with Spencer carabines, with which to protect themselves against the attacks of Indians upon the mail trains, which it is feared they may make.

It is said that fifteen bids for the completion of the Hoosac Tunnel were received by the Executive Council. The lowest was $4,270,000. The parties making the bid were required to furnish securities amounting to $500,000 which being too large to meet their views. The matter remains in abeyance.

An explosion occurred on the 22d ult., in Richards & Verplanck's oil refinery in Jersey City, by which two men were killed and two seriously injured. Twenty thousand dollars worth of oil was burned.

The Chollar Potosi mine, Nevada, has made its annual report for the fiscal year, ending May 31st, 1868. Amount of ore extracted from the mine 70,330½ tuns. The total quantity of ore milled was 77,954¼ tuns. Average yield per tun, $24 14; cost of milling, $14 75; actual cost of extracting per tun, $4 24; filling mine and dead work per tun, extracted 83½c.; taxes per tun 22½c; expenses at new works per tun, $1 87; incidentals per tun, 26c. Total expenses, $21 68. Net yield per tun, $2 46.

At the works of the Mansfield Elastic Frog Company, Hartford, can now be seen a series of railroad frogs joined together so as to form one huge diamond forty feet in length, and costing three thousand dollars. It is designed for the double track crossing of the Boston and Albany railroads near Boston, and is said to be the largest piece of this kind of work ever attempted.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

ROSSING MACHINE.—C. Gilpin and L. T. Dickinson, Cumberland, Md.—The object of this invention is to construct a simple and effective machine which shall ross the bark more thoroughly than has heretofore been done.

ROSSING MACHINE.—C. Gilpin and L. T. Dickinson, Cumberland, Md.—This improvement consists in the employment of a reciprocating saw, instead of a cutting blade, to split the bark as it comes from the rollers.

COFFEE ROASTER.—J. E. Edmundson, Bartlett, Ohio.—The object of this invention is to produce a neat and convenient instrument for household use, for the purpose of roasting coffee expeditiously and uniformly, and without diffusing its aroma, and thereby impairing its strength.

CULTIVATOR.—M. F. Lowth and T J Howe, Owatonna, Minn.—This invention has for its object the fastening of the cultivator tooth to the beam in such a manner that, while it remains firmly in position under any ordinary strain, it will yield when in contact with an immovable oostacle without breaking.

GLASS LIGHTS.—Wm. A. Demuth, New York city.—The object of this invention is to construct a beautiful and cheap glass light for windows, lanterns, and other purposes, which shall be more ornamental and less expensive than plate glass, and which shall be less liable to damage by fracture than any other glass lights now in use.

RUSTIC BLIND SLAT PLANE.—R. E. Lowe, Upper Alton, Ill.—The object of this invention is to construct a simple and easily adjustable instrument by which the slats, of which rustic window blinds are made can be cut out from the wood in an easy and expeditious manner. The instrument is so improved that the slats can be cut of different widths and thicknesses, while, if the plane becomes dull, it can be made to present a sharp edge again in a moment of time, without the necessity of removing it to the ground or sharpened.

MAN POWER MACHINE.—Jacob G. Deshler, Allentown, Pa.—The object of this invention is to furnish a simple and effective machine for transmitting man power with the least fatigue to the operator. It consists of a vibratory foot board, in combination with a crank shaft, and a pair of double pitmen connecting the cranks of the crank shaft.

NEST BOX FOR HENS.—B. F. Hayward. Nebraska city, Nebraska.—The object of this invention is to provide a nest box which will close automatically when the hen gets upon her nest, and will open in the same manner when the fowl wishes to leave her nest, whereby a setting hen may be protected from annoyance from other fowls or other animals prone to annoy hens while hatching or laying.

BEEHIVE.—V. Zimmerman, Morris, Ill.—This invention relates to a new and improved beehive, and it it consists in a novel arrangement of hanging or suspending the comb frames, the employment of a slotted partition board, a novel moth trap, and adjustable slides.

BEE HOUSE.—James Tallman, Clayton, Ill.—This invention relates to a new and useful improvement in a bee house, or hive, and which is termed the "community hive."

LAMP.—J. P. McGee, Trenton, Tenn.—This invention relates to the method of fastening the burner to the lamp, whereby the use of a screw is avoided, and the process of attaching and detaching the burner is greatly facilitated.

MACHINE FOR MOLDING CANDY.—E. K. Powers, Grand Rapids, Mich.—This invention relates to a new and improved machine for molding candy, and is more especially designed for molding pop-corn candy. The invention consists of an improved means for forming the candy into proper sized sticks, and then compressing the same.

CONCRETE BLOCK PRESS.—O. V. Evans, Ripley, Ohio.—This invention relates to improvements in presses for making concrete blocks, whereby it is designed to provide a simple and effective machine for accomplishing the same, and it consists in the arrangement and combination of the parts constituting the same.

BEEHIVE.—Geo. Eason, Lyons, N. Y.—The object of this invention is to provide a chamber for the deposit of the building cells, and that portion of the honey, on which the bees subsist, which may be readily adjusted to a capacity to suit the demands of the family, and also an improved arrangement of clear honey boxes.

PROJECTILE FOR FIRE-ARMS.—Charles F. Brown, Warren, R.I.—This invention relates to a new shell projectile, to be propelled by breech or muzzle loading ordnance, the shell being of that class which explodes, when it reaches the mark. The invention consists chiefly in the use of a tubular fuze holder within the loaded shell, and in the use of a plunger within the fuse holder, all operating in such manner that the fuse is ignited by the charge, which propels the shell, but that it does not ignite the powder in the shell until the latter has struck its mark, the ground, or some other object.

WIND WHEEL.—Benjamin H. Goodale, Newburyport, Mass.—This invention consists in an arrangement whereby the sails are suspended from the outer ends of the horizontal arms of a vertical shaft, in such a manner that the action of the wind will open them when they have arrived at the position when it will have no effect on them by direct action, and thereafter operate on them by reaction for a considerable portion of the revolution. It also consists in an arrangement of means for furling the sails, and thereby stopping the wheel, or unfurling them to set it in motion.

PARLOR AND FIELD BALL GAME.—William H. Wilsen, Providence, R. I.—This invention relates to a new game, which is partly one of skill and partly of chance. The invention consists in the use of a revolving pointer or index hand, moving over a disk on which numbers or words are marked, said index hand being either itself exposed, or having a pendant or arm which is exposed to the action of a ball thrown by the player. As the ball strikes the pointer or its arm, the same will swing around its pivot, and will, when it comes to rest, point to a figure, word, or mark, on the disk, thereby indicating the further progress of the game.

FIRE ESCAPE.—Jürgen L. Jürgens, New Orleans, La.—This invention consists of a car provided with axles made adjustable in the direction of the length of the same, and connected together by a shaft having a right and left hand screw thread, by which the said axles may be expanded or contracted as it is moved up or down inclined ways, placed outside of the building convenient to the windows of the same, to admit of the inmates of the building entering the car as it passes down from one window to another.

INSTRUMENT FOR REMOVING CORKS FROM BOTTLES.—George W. Schermerhorn, East Livingston, Me.—This invention has for its object to furnish a neat, simple, cheap, effective and convenient instrument for removing corks from bottles.

PENCIL SHEATH OR HOLDER.—Samuel Ayers, Danville, Ky.—This invention has for its object to furnish a neat, simple and convenient device by means of which a pencil may be safely held in such a position as to be always at hand ready for use.

YOKE FOR HORSES AND OTHER ANIMALS.—Thomas J Barnes, Cambridge, Ill.—This invention has for its object to improve the construction of the improved horse yoke patented by the same inventor, Nov, 5, 1867, and numbered 70,502 so as to make it more convenient and effective in operation.

HAY RAKE AND LOADER.—William H. Hitesbew, Perrysburgh, Ind.—This invention has for its object to furnish a machine, simple in construction and effective in operation which will collect or rake the hay and deposit it upon the wagon, doing its work thoroughly and well.

HORSE HAY RAKES.—William H. Cook, Bridgehampton, N. Y.—This invention has for its object to improve the construction of revolving horse hay rakes so as to make them more effective and convenient in operation than when constructed in the ordinary manner.

SORGHUM EVAPORATOR.—Jesse B. Lewis, Lincoln, Ohio.—This invention has for its object to furnish an improved attachment for evaporating pans by means of which the pan may be made self skimming by the use of which a purer and better article may be manufactured and with less labor than when the ordinary evaporating pans are used.

HEAD BLOCK FOR SAW MILLS.—W. A. L. Kirk, Hamilton, Ohio.—This invention has for its object to furnish an improved device for attachment to head blocks, by means of which the sawyer may conveniently a just the knee in such positions that a given number of pieces of a uniform width may be cut from timber of a given thickness.

TRUCK FIRE ESCAPE LADDER.—George Skinner, Brooklyn, N. Y.—This invention has for its object to furnish an improved truck extension ladder designed especially for use as a fire-escape but equally adapted for use for any of the purposes to which an extension ladder can be applied and which shall at the same time be light, strong, simple in construction, and easily operated.

PISTON-ROD PACKING.—Samuel Lockard, Lagrange Ind.—This invention relates to an improvement in packing around piston rods of steam engines and which method is adapted to other kinds of packing.

HYDRANT.—William Kearny, Union Township, N. J.—This invention relates to inventions in street hydrants for the supply of water to fire engines or for other purposes.

METHOD OF STORING GRAIN.—R. M. Mitchell, Fort Atkinson, Wis.—This invention relates to a new and useful improvement in the method of storing grain in store houses where the grain is elevated and delivered into bins.

CAR BRAKE.—G. N. Jones, Oshkosh, Wis.—This invention consists in the arrangement of a friction pulley upon the axles of each car, to which is connected by a cord a lever suitably arranged to press the brake against the wheel, when the cord is wound up on the said friction pulley. The friction pulleys are set into rotary motion by the action of cords attached to slides at the tops of the cars, which slides are actuated by a line shaft running from car to car, connected by universal joints between each car, which shaft is turned in either direction by levers and toothed segmental wheels, gearing with wheels on the shaft at the ends of each car, the lever being actuated by the brakeman.

QUARTZ MILL.—Samuel Swesey, Malta, Ohio.—This invention relates to a new and improved method of crushing and pulverizing quartz for the purpose of separating the precious metals therefrom, and it consists in providing a suitable mill with grinding stones, between which the quartz is subjected to a grinding process, and also in the manner in which the mill is constructed and the upper grinding stone is revolved and adjusted.

ROW LOCK.—P. H. Mills, Green's Landing, Me.—This invention has for its object to furnish an improved row lock to receive the oar when rowing, sculling, steering, etc., and hold it securely, while at the same time allowing it to be moved freely in any desired direction, and which shall be so constructed as not to be liable to wear or breakage, and will work without clottering, entirely doing away with splitting row locks, breaking pins, and other annoyances so common with row locks constructed in the ordinary manner.

VALVE GEAR FOR OSCILLATING ENGINES.—C. H. and D. B. Overton Dover, N. J.—By this invention a common reciprocating slide valve is used in an oscillating cylinder, the stem of the valve being connected with a circular plate or disk, which has a reciprocating motion on the trunnion, which latter has two parallel faces planed on it for the disk to travel on. The disk is encircled by a hoop working easily on it, like an eccentric hoop, the said hoop being affixed to an eccentric rod from the crank shaft. This invention supplies the desideratum long existing in the use of oscillating engines, and provides a valve gear which is as simple and free from uneven wear as the valve gear of a fixed cylinder engine.

NAIL MACHINE.—Dennis Savery, Wheeling, W. Va.—The object of this invention is to cause the griper to retract as speedily as possible. It consists of a V-shaped spring having one end affixed to the cam end of the griper and the other end clasping or bearing against that side of the cam shaft which is opposite the griper, thus holding the end of the griper against the shaft, and by its tension actuating the griper against the shaft instantaneously after the cam has passed the tappet projection on the griper.

CENTRIFUGAL MACHINE.—S. S. Hepworth, Boston, Mass.—The object of this invention is to provide a centrifugal machine in which the pernicious effect of gyration is softened by suspending the curb and arranging it so as to afford the step bearing for the shaft of the basket, thus allowing both the curb and the basket to partake of the gyrating movement, which movement is softened by means of an annular rubber roll running around in a fixed circular step, a stud affixed to a cross beam in the curb working within the roll. Other devices pertaining to the hanging of the basket shaft and to the accessory brake mechanism conduce to perfect the operation of the machine.

BABY WALKER.—Fred Geisler, Bristol, R. I.—This invention consists in the construction and arrangement of the several parts, consisting of a circular platform provided at its vertical axis with a rotating shaft supporting a curved arm, at the end of which is secured a holder for supporting the child at the waist, in a manner to admit him to traverse the circular path of the platform.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

D. B., of Mass.—The art of making good furniture varnish cannot be given in a limited space. For a full account of the process we refer you to Ure's Dictionary of Arts and Manufactures.

A. D. M., of Conn.—Plaster molds for stereotyping should not be soaked with oil. A very little should be rubbed over the surface before making the cast. Use as little as you can, and touch entire surface, and the smoke will not trouble you.

S. M. D., of ——How can I make permanent and varnish water color drawings? First size them with a cold solution of isinglass in water. Then varnish with a varnish made of Canada Balsam 1 oz. and Spt's Turpentine, 2 oz. Mastic varnish is however the best. It can be obtained where artists materials are sold.

M. J. W., of Pa.—Is machinery used for laundry purposes in the putting of a finish upon linen. Answer, It is.

J. M. W., of Va.—The black dust used in making fire-proof mortar is the dust found about the forges of blacksmiths.

G. J. G., of Ga.—You may discharge the air from any part of perimeter of a blower without affecting the blast, but the length of the pipe through which you conduct will affect it materially. The shorter and straighter it is, the better blast you will obtain.

Business and Personal.

The charge for insertion under this head is one dollar a line.

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Will be exhibited, at the Fair of Maryland Institute, the best Wood Lathe, for turning irregular forms, ever invented. Stewart's Patent. Four cutter wheels operating on same piece of wood. Amount of work in proportion to number of cutter wheels. Patented April 2, 1867. Machine and patent right for sale.

Patent hinge-back albums—the only strong album. No breaking in the back. No rebinding. Altemus & Co., Philadelphia.

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Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

The attention of manufacturers of hardware and of metal or or wooden small wares generally, is directed to the very superior enamel or finish given to such articles by the American Enamel Co., of Providence, R. I., which, for beauty of luster and durability, is unsurpassed. For an imitation of jet or vulcanite jewelry it is just the thing. Samples on wood may be seen at the office of Landers, Frary & Clark, 31 Beekman st., N. Y., or will be furnished on application to the Co. by mail.

For sale—a complete set of the "Scientific American," neatly bound, (31 volumes), old and new series; also, odd volumes. Address L. M. Montgomery, Box 2953, New York.

Parties about to buy steam boilers should examine Root's wrought iron sectional safety boiler at 95 and 97 Liberty st., New York. See advertisement.

Millstone-dressing diamond machine, simple, effective, and durable. Also, Glazier's diamonds, diamond drills, tools for mining, and other purposes. Send stamp for circular. J. Dickinson, 61 Nassau st., N. Y.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws Apply to J. E. Emerson, Trenton, N. J.

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For breech-loading shot guns, address C. Parker, Meriden, Ct.

Winans' anti-incrustation powder, 11 Wall st., N. Y. 20,000 references. No foaming. No injury. 12 years in use. Imitations plenty.

NEW PUBLICATIONS.

CABINET-MAKER'S ALBUM OF FURNITURE. Comprising a Collection of Designs for the Newest and most Elegant Styles of Furniture. Illustrated by Forty-eight large and beautifully Engraved Plates. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street.

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NEW ROCK DRILLING MACHINE.

We witnessed on Tuesday in company with Mr. I. B. Reynolds of Rutland, Vermont, the operation of a drilling machine recently invented, and of which he is one of the proprietors. The machine consists of an upright boiler, having an oscillating steam cylinder attached which drives the drill, and a pump which constantly forces a stream of water into the bore-hole. The drill is a short hollow cylinder of iron armed with diamonds placed upon the lower end, which is serrated, to form seats for the diamonds. This tool is fixed to a hollow tube of iron to which two gears are attached, connecting with the primary gear, which is driven by the steam cylinder. The upper and lower gear give, by the ordinary adjustment, reverse motion to the tube. The water is forced through the tube by the pump and effectually clears the bore-hole of detritus. The cutting is done in a circle, by the revolution of the tool, and a plug is left which passes up through the tube as the latter descends, leaving, however, sufficient room for the descent of the water. This plug or cylinder of rock is easily broken off and removed, and is in many cases valuable, as it is always a good specimen of the rock through which the boring is done. Surveys may thus be made of rocks deeply imbedded and their quality ascertained with comparatively small expense. The machine, working at moderate speed, bored in our presence a very smooth, round hole, through extremely hard rock, at the rate of one inch per minute. The diameter of the hole drilled was one and one half inches. Inspection of the drilling tool with a magnifying glass, showed no appreciable wear. The machine is perfectly automatic, and will drill with equal facility at any angle.

DANNER'S PATENT PENCIL GUARD.

The little device illustrated in the engraving is designed for clerks, freight agents, merchants, and others whose business requires during business hours frequent resort to the common lead pencil. It is intended as a holder for the pencil and a guard to its point, so liable to be broken and so annoying to frequently sharpen. The guard pinned to the coat or vest, is a much better receptacle for the pencil than the pocket, and it has the advantage of being always ready and in place for use. It is a simple sheath of sheet metal, of a proper diameter to receive the pencil, the lower or closed end being of a larger diameter and lined with a circular or cylindrical gland of india-rubber designed to embrace and hold the pencil. In the engraving the pencil is seen with the sharpened point protruding, but it may be placed in the sheath by either end. Two spring needles or pins serve to secure it to the clothing. It is durable, and cheap. It may be made of white metal, sheet brass, or other material, and can be left the natural color of the material, plated, or japanned.

Patented, June 16, 1858, by John Danner, Canton, Ohio, who may be addressed for additional particulars.

The New Oxygen Light.

The American proprietors of the oxygen light, recently invented in France, have been submitting it to Prof. Doremus for examination and experiment. We understand that the results of these experiments have been so satisfactory that a company has been formed to introduce the invention. A large laboratory is to be erected, two hundred feet long and one hundred in breadth, on Forty-first street, in this city, for the extensive manufacture of oxygen gas. This gas is to be mixed with the ordinary street gas. An exchange says:

"It is not intended to lay pipes in the thoroughfares for the conduction of the oxygen for some time, even if the company were authorized, but they do propose conveying it in portable vessels to the buildings, public or private, in which it may be desised for illuminative purposes. Mr. Booth is placing throughout his new theater on Sixth avenue duplicate pipes, so that, when the oxygen is manufactured in quantities sufficient, it can be introduced without delay, and many gentlemen of fortune who have seen the light at the office of the company in Nassau street are also anxious to have it in their houses.

"About the middle of November, it is thought, the new light, which is nearly 200 times more brilliant than that emitted by a wax candle, and 14 times more powerful than the illuminative power of carbureted hydrogen (19¼ times that of the gas made by the Manhattan Company, as shown by actual measurement in the laboratory of the College of the City of New York), will be formally and permanently introduced. It is not only more powerful, as has been demonstrated, in brilliancy, but, compared with the ordinary gas light, many per cent cheaper. A thousand cubic feet of oxygen will cost the consumer, it is estimated, $25, and a thousand feet of street gas, $3, or $28 for two thousand feet of oxygen and carbureted hydrogen, which total of mixed gases is equal in their illuminative quantities to not less than 28,000 feet of the gas that is consumed in our street lamps, at a cost of $74, or $46 more than apart from its great steadiness, purity, and beauty, the oxygen light it is now believed will cost. This will certainly, in the course of a year, aggregate to the people of a city so large as is New York an enormous saving."

BURGESS' PATENT WINDOW WIPER.

Next to the nuisance of washing off side-walks with hose in our cities is that of window-washing. In summer this is

simply an annoyance; in winter absolutely dangerous, as the flagged or bricked walks are made really unsafe for pedestrians. The rebound of a stream from the nozzle of a hose pipe against a window in warm weather will do no other damage than to wet and soil the clothes, but a fall on slippery pavements jeopardizes life and limb. To prevent this splashing of water with its accompanying annoyances in washing windows is the object of the device illustrated in the engravings.

It is a rectangular frame, A, made of sheet metal, as tin, and attached by a swivel to a handle so that it will freely rotate. The sides are perforated, as seen in Figs. 2 and 3. On one of these faces, B, is secured, by means of elastic bands, a washing cloth of Canton or woolen flannel, or other material, or, for polishing the windows, a piece of chamois skin may be substituted. The other face, C, is covered first with a sheet of rubber or other elastic material, over which is drawn a wiping cloth two yards or more in length, and wound on rollers inside the frame or box. One end of this cloth is secured to the pivot, D, of the box, which passes through it from end to end, and the other to a roller inside the box, having a crank E, on the outside of one end by which the cloth may be wound up, thus presenting a dry face as fast as that portion in use becomes wet. By turning the box on its pivot or swivel the cloth may be wound or unwound on the central spindle at pleasure.

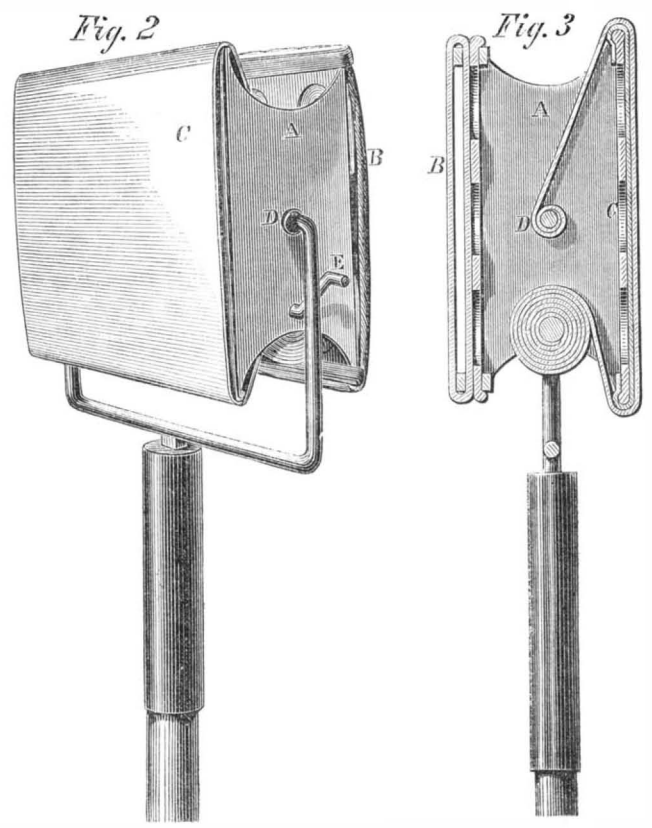

Fig. 1 shows the method of using the device; Fig 2, gives a perspective view, and Fig. 3 is a transverse section. The rectangular form of the implement allows it to work into the corners of the panes. By the use of this implement there is no necessity of climbing steps or chairs, and as there is no spilling and spattering of water it may be employed for inside as well as outside cleaning. The box can be reversed instantly to wash or wipe. Its advantages are apparent at a glance.

Patented July 28, 1868, by B. F. Burgess, Jr., who may be addressed at 9 West street, Boston, Mass. The patentee is desirous of disposing of the entire right, as he is engaged in another business, and the price and terms will be made correspondingly accommodating.

A Large Elevator in Boston.

Boston is to have another big feature beside the great organ. The Boston and Albany Railroad corporation are erecting a new and capacious grain elevator. The plan of the building is somewhat different from the large elevators at Albany, N. Y., Chicago, and other places. The building is making of brick and wood, and will be about seventy feet high. The upper or wooden story will contain 82 bins, some of which will contain 1,500 bushels of grain, and others twice that amount. The total capacity of the edifice will be 250,000 bushels. The machinery will be worked by steam, and there will be millstones to grind corn for patrons. On the lower floor is a track to accommodate three freight cars at the side. The center of this floor is occupied by a deep vat, into which the grain will be shoveled from the cars in a very few minutes, and the empty cars will then be run out and three full ones take their place, and so on. In the center of the building will be a shaft running up to the roof. An endless belt runs over a wheel at the roof and another in the vat, the face of which is covered with cups, and as the belt will constantly move, those cups will ceaselessly go up full and come down empty.

At the top another form of propulsion will carry the grain into any particular bin desired. By this process a car load of grain can be brought direct from Chicago, emptied at the elevator, in the elevator, in ten minutes, and the car sent back the same day. The cost of elevating and storing the grain will be one cent per bushel for the first five days, and for a longer storage so much for every ten days. The grain can be readily removed from a pointed opening in each bin. The detention of cars loaded with grain, while waiting for merchants to take it away, will be remedied, and the facilities for storage will be an item which it is expected Western merchants will appreciate. The elevator will be in working order in about two months.

New Theory about the Formation of the Diamond.

The origin of the diamond has been a subject of much speculation, inasmuch as the circumstances under which it is found in nature afford us no clue to the process of its formation.

Lately, Prof. Simmler of Switzerland has added a new theory to the many existing ones, which seems to us to be the most probable of all. The diamond often incloses cavities, which in some instances contain a gas, in others a liquid. Sir David Brewster, who had given much attention to the subject, found in investigating the nature of the liquid, that its refractive power is less, but its expansive power greater than that of water. Further inquiry as to the probable nature of these substances was not made until quite recently.

In comparing the results obtained by Brewster with those calculated for other liquids, Simmler found the numbers for the expansive and refractive power of the liquid referred to, to coincide singularly with those for liquefied carbonic acid. But other facts observed by different savans, tend to prove also the presence of this agent in the coating of the most valuable of gems. We mention the bursting of such crystals, when exposed to heat, the frequent occurrence of two liquids in the cavities, wherefrom the one behaves like water towards heat and light and the other like liquid carbonic acid. On one occasion it was observed that the liquid in a quartz crystal which was dashed to pieces, scattered its contents around with a great noise, burning holes in the handkerchief wound around the hands of the experimenter. The acid content itself had disappeared. Upon these observations Prof. Simmler establishes his theory. If carbon, as he supposes, is soluble in liquid carbonic acid, it would then only be necessary, to subject the solvent to slow evaporation—the carbon would thereby be deposited and by taking proper care assume crystalline forms. In evaporating quickly, the so-called black diamond might perhaps be produced, which in the state of powder is largely used for polishing the colorless diamond. Though the liquid referred to has never been subjected to chemical analysis, the formation of liquid carbonic acid in the interior of our globe, may nevertheless be considered as highly probable. In the gaseous form, we know it to be evolved in immense quantities from fissures, volcanoes, and mineral springs. When now this gas is produced in the cavity of a rock which is free from fissures, it will finally be compressed so highly, that it will assume a liquid form by itself. Certain rocks may be considered strong enough to resist the expansive force of this agent. Let now carbon be present. If the same is soluble, it will be taken up and deposited again while the carbonic gas is escaping through some newly formed cracks or fissures.

Chinese Grammar.—Max Müller recommends the study of the Chinese grammar. "Those," he remarks, "who can take an interest in the secret springs of the mind, in the elements of pure reason, in the laws of thought, will find a Chinese grammar most instructive, most fascinating. It is a faithful photograph of man, in his leading strings, trying the muscles of his mind, groping his way, and so delighted with his first successful grasps, that he repeats them again and again. Every shade of thought that finds expression in the highly finished and nicely balanced system of Greek tenses, moods, and particles, can be expressed and has been expressed in that infant language by words that have neither prefix nor suffix, no termination to indicate number, case, tense, mood, or person.

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ONE IDEA MEN.

An exchange says that "one idea men are seldom healthy wealthy, or wise." It adds that "It matters not whether they be crazy philanthropists, wild enthusiasts, or dull dirt diggers. Nature abhors such men quite as much as she does a vacuum and invariably punishes them. She loves variety and has furnished it in endless profusion in all her works." The above is a good example of the glittering generalities, which captivate the minds of men by their sound while sense is lacking. The statement is not true, while the illustrations drawn from nature are either false or inapplicable. The idea that nature abhors a vacuum was long since exploded, and although nature has furnished an infinite variety of all that is pleasing and useful to man, as well as some things which are not so obviously pleasant and useful, we find upon the most superficial observation each animal or plant confined to certain functions which are the purpose or the "one idea" of its existence. Cows do not attempt to fly, nor birds to burrow in the earth, unless they are sand-martins, and it is just as absurd to suppose that all men or that any man can know or do everything, as to suppose bees capable of giving milk, or pigs to hive together and make honey.

The truth in regard to this matter is that men who achieve great eminence, or accumulate wealth by their own efforts are "one idea" men in the highest sense of the term. Philosopher or reformer, inventor or merchant, each must have a definite aim in view to be successful, an aim to which all other knowledge, all side issues, all effort must converge, and this aim then becomes the one idea until its accomplishment.

It is difficult to conceive of any field of exertion where such concentration of thought and effort will not result in success and even fame. The best rower, the best skater, the best dancer, the orator who rules the hour, the actor who draws the crowd, the eminent jurist, the eloquent divine, all are men who have earned their supremacy by dint of persistent effort in one direction. No matter how humble or how frivolous an occupation may be, a man who is superior in it to any other has secured, if he has not attained, all the success which can be expected in his peculiar field; and whether in learned professions, or mechanical arts, it has been just such one idea men who have always gained distinction. And we repeat they always will gain it.

Nor is devotion to a single purpose opposed to liberal views and general attainments. On the contrary, we have always found those men who are called one idea men, more liberal in their views of affairs, more tolerant of others opinions, and more highly cultivated than the "Jacks at all trades," by far more numerous and blatant, with whom we come in contact. A distinguished clergyman once assured us that he never read the Bible with greater pleasure or profit, or attained more scriptural knowledge in an equal time, than when he perused the Old Testament with the one idea of tracing link by link the genealogy of Christ. It is impossible for the mind to closely examine any subject without making it a focus upon which is brought to bear the concentrated light of collateral science or philosophy. Hence it is that minds which have been closely kept upon a single subject of life study although they may not have skimmed over so many topics as others, who think more disjointedly, come to be recognized authorities. What they know they know thoroughly, and their opinions may be depended upon. Probably no man ever existed of more diversified attainments than Watt, and no man ever was a more strictly one idea man than he in the just sense of the term. A distinguished author forcibly remarks that "in the secular sphere it is conceded that the powerful minds are those who rigorously confine themselves to one department of thought. Newton cultivated science and neglected literature. Kant wrought in the quicksilver mines of metaphysics for fifty years, and was happy and mighty in his one work. These men made epochs, because they did not career over the whole encyclopedia. And the same is true in the sphere of religion. The giants in theology have dared to let many books go unread, that they might be profoundly versed in revelation. And the mighty men in practical religion, the reformers, the missionaries, the preachers, have found in the distinctively evangelical elements of Christianity, and their application to the individual soul, enough, and more than enough, to employ all their powers and enthusiasm."

In practical mechanics, as well as in philosophy, we have always found this class of men to be the most reliable, and successful, and for these reasons as well as many others we have not stated, we say give us the one idea men.

TREATMENT OF APPRENTICES BY "OLD HANDS."

The love of power and its exercise, the assumption of superiority in position and knowledge, tend to make tyrants of all men. But nowhere is the exercise of this disposition more unpleasantly seen and more unpleasantly experienced than in the shop. It is very hard for the boy, perhaps just from school, where his labor was merely that of the mind, and where, perhaps, he had the sympathy as well as the assistance of a judicious teacher in his tasks, to come as an apprentice in the shop and accustom his untried hands to the hard substance of metals and woods, without his being compelled to bear the harder taunts, jokes, and witticisms of his seniors. Yet these he must, not unfrequently, bear. Instead of trying to make the apprentice's course plain, smooth, and pleasant, it is too often the case that the journeymen, otherwise sensible and considerate, encourage if they do not inaugurate a system of petty annoyances and petty tyranny, as disgraceful to their character as men as it is confusing and cruel to the victim. There is nothing manly in this. If it is designed to impress the novitiate with the superiority of the attainments of his tormentors, that end could be gained as readily by quietly pointing out his failures, and instructing him in his duties.

This victimizing of apprentices is a relic of barbarism, imported here from the old countries, England especially, where the lower class of workers seem to have the idea that brutality is the only proof they can give of their superiority over their inferiors. We have seen many cruel experiments tried by this class of men who disgrace their nature and calling. Imposing upon ignorance, betraying confidence, and falsely swindling the trust given them, they take a demoniac pleasure in fooling, bothering, and annoying those they should be proud to instruct and assist.

To a lesser extent this course is pursued in almost every shop in the country. Where this spirit dares not be manifested openly, in the way of practical miscalled jokes, it is in either giving false information, or a refusal to give any; in a neglect of the common shop courtesies, and a supercilious manner and pretentious bearing. A miserably mean jealousy, born of a low spirit, is the source of all this nonsense. It does not pay. It impairs the confidence the apprentice should feel in the superior knowledge of the journeyman, tends to disgust him with his business and his future associates, and leads him to refuse to listen to the instructions of those wiser than he.

Possibly, before the time of his apprenticeship expires, he may learn to estimate these annoyances at their proper value, but it is more certain that the feeling engendered by the foolish tyranny to which he has been subjected will influence him through life. How much better for him, and more honorable for his seniors, that they gave him encouragement by word, and assistance by act, so that the young man striving to become one of the honorable guild of mechanics, should feel at once, in his introduction to a shop, a fraternal sentiment toward his fellow workmen, and be certain that any failures or mistakes he might make would be occasions of assistance from his superiors. The latter would lose no jot or tittle of their superiority, while the novice would be improved in his workmanship, his respect for himself and for his teachers. Deal justly by the apprentice, fellow journeymen.

IS BRAIN LABOR PECULIARLY EXHAUSTING.

It is quite a common idea that the labor of the brain, the tasking of the mind, the devotion to pursuits demanding mainly mental exercise, is exceeding deleterious to both physical and mental health. The idea conveyed is that the brain (if that is the physical organ through which the mind acts) is a very tender and delicate portion of the human organism, needed to be perpetually dandled on the lap of carefulness and preserved from rude shocks and even from steady hard work.

The exhausting labor of the muscles, such work as handling heavy bodies while exposed to hot sun or chilling winds —that work done by teamsters, stone and brick masons, farmers, hod carriers, etc.—seldom receives notice from writers who harp on the exhaustive nature of brain work. There are other employments, not requiring, perhaps, so great an outlay of physical power, but which are dreadfully monotonous, merely mechanical, and without the stimulus of mental interest, which are never mentioned as peculiarly exhausting; yet probably few brain laborers would be willing to drive a team, pave streets, build houses, or weed an onion bed rather than think, and write, and talk.

The ultimate result of this reasoning about the exhaustive nature of brain work would be to reduce the worker to a mere machine or a mere animal, and instead of our leaders of thought, our contrivers of inventions, our producers of improvements, and our intelligent mechanics, we should have a community of human clods, eliminating no new ideas, applying to new purposes no well known principles, and making no new improvements. If it is said that the excess, rather than the exercise of brain work, is what should be guarded against, it may be replied that what is excessive labor to one is mere play, or, at least, no task to another; each man is the best judge of the limit of his mental as well as of his physical powers.

There are no more persistent brain laborers than our mechanical inventors and scientific discoverers, yet we do not remember any instance where either of these classes, because of their devotion to their specialties, have become insane or died from softening of the brain. We believe the brain is as strong as the muscles, that it will as quickly give the alarm and demand rest as the legs or the arms. We think our inventors and mechanics need not coddle their brains any more than their biceps muscles. We are thinking animals, and thinking is healthier than mental stagnation.

PROGRESS OF THE ART OF DENTISTRY.

Although from remote periods attention has been paid to the means of preserving and beautifying the teeth, it is only within the last century that the art of dentistry has attained the rank of a distinct profession. All that is known of the early practice of the art has been derived from the remains of teeth found in ancient sepulchres, and the meager allusions to the subject found in the works of Greek and Latin authors. Galen wrote upon the subject in the second century, and Fallopius, Eustachius and Paré in the fourteenth, fifteenth, and sixteenth centuries, but no elaborate treatise appeared until the eighteenth century. The most prominent of those upon which the modern school of dentistry may be said to have been founded, was the celebrated treatise of John Hunter.

The authors of these works, were however, not practical dentists, and their works relate principally to the anatomy of the teeth, and the nature of the diseases to which they are liable, rather than to the repair of decayed teeth, and the supply of artificial ones, which now are the prominent features of the art. Since these writers, there have appeared numerous treatises of a more practical character, and the progress of the art has been constant and rapid.

The art of filling teeth with gold is a very old one, and was practiced by the Egyptians, as also the substitution of artificial teeth of wood and ivory fixed to plates of gold. The practice of filling or plugging teeth with metals, as well as the fixing of artificial teeth to plates, was revived upon the invention of porcelain or mineral teeth, which took place in the earlier part of the present century.

Mineral teeth were originally a French invention, but they owe their perfection principally to American improvements. They are now made so as to imitate almost perfectly the natural teeth, as well as the gums, in form and color. The artificial teeth made of ivory, or the teeth of animals modified in form to resemble human teeth were completely superseded by the porcelain, as soon as their merits became generally known; mineral teeth being more cleanly, as well as more natural in appearance. Gold, silver, and platinum were used to mount them. The demand for the services of the dentist was largely increased by the adoption of this improvement.

The introduction of rubber-plate in the mounting of teeth, also, by greatly reducing their cost, greatly increased the demand. Teeth thus mounted gave great comfort to the wearer from the lightness and elasticity of the plate. Some doubt was at first felt as to their effect upon the health, as well as their durability and cleanliness; but while in these respects rubber is, undoubtedly, somewhat inferior to gold plate, it is not so much so as to greatly depreciate the value the improvement, and their popularity is daily increasing.

The dentist has latterly been called upon to enlarge his field of operations. Eminent surgeons have not failed to see that the resources of the art were equal to the accomplishment of more than the repair, and restoration of teeth. It was evident that it might be extended to the connection of malformations as well as to the artificial supply of parts which had fallen a sacrifice to disease, or had been removed by the knife of the surgeon. Thus a new and extensive field is opening, and a more extended knowledge of general anatomy and the principles of surgery is required of the professors of this art than has hitherto been requisite. The professors of general surgery are beginning to recognize a powerful adjunct in the sister art of dentistry. The *Medical Gazette* announces that hereafter, a department devoted to dental science is to be a feature of that publication. We hear of colleges of dentistry in successful operation in different parts of the country, and of others being projected, while among our most valuable exchanges are the journals devoted exclusively to this art. These facts are a sufficient warrant that the art is still a progressive one and there can be little doubt, that the future will see dentistry taking its proper and legitimate rank among the learned professions.

POWER LOOMS IN THIS COUNTRY.

Although the art of weaving is of such antiquity that no records exist as to the date of its discovery, it is only about eighty years since the first power loom was invented, and not so long since it was so far perfected as to possess a decided superiority over the hand loom. To Rev. Edmund Cartwright, in 1787, belongs the credit of constructing the first successful power loom.

In this country power looms were first built and set at

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work in Waltham, Mass. Mr. Francis Cabot Lowell, for whom the city of Lowell, Mass., is named, returning from England in 1812, after a two years' visit, which he employed largely in examining the improvements introduced in manufactures, attempted the construction of a power loom. He employed Mr. Paul Moody, of Amesbury, Mass., an ingenious mechanic, to build the machine, and it was finished, patented, and in successful operation in 1815. Probably the efforts of Mr. William Gilmour, who, in 1814, came to this country from Glasgow, bringing patterns of the power loom, and who was employed by Judge Daniel Lyman, of Providence, R I., the associate of Mr. Lowell in the enterprise, contributed to the success of the Waltham loom. About the same time Gilmour built looms for several of the Rhode Island manufacturers. His loom cost only $70, while the Waltham loom cost $300.

From this time forth power looms became the rule, and hand looms the exception. New patents were being issued frequently, and new styles of the loom were being constructed. The mills which had been employed mainly in spinning yarn to be woven at home in the family, began to be used for the weaving of cloths, and the immense cotton manufacture of the country may be considered to have been fairly inaugurated.

ON THE CAUSES OF EXPLOSIONS WHICH OCCUR IN THE POURING OF LIQUID METALS INTO WATER.

Dangerous explosions have repeatedly occurred in pouring liquid metals into water. Mr. Kayser refers to a case in Upper Silesia, where in pouring several casting-ladles of melted pig iron into a pan filled with water, a frightful explosion took place, killing one man and wounding several others. Similar cases have been observed at the Altenau Iron Works in the Upper Harz, when for the preparations of a bath liquid iron was poured into a Pattinson pan, and another occurred at the preparation of granulated iron in lead works of the same district. To this end the pig iron was conveyed from the furnace through a groove to a perforated and clay-covered iron ladle, when it was left to drop in a small stream into a basin with water, which had the advantage of a stream of cold water continually passing through it. Explosions had never occurred. One day, however, when experimenting with the thickish product, the holes of the ladle were choked. The iron naturally escaped in a strong body over the rim in the basin. In the beginning it did not show any suspicious effect but after some time, the contents of the basin, water, mud, and glowing iron, exploded among the numerous visitors, who rushed speedily out of the foundery. Happily they escaped with a fright and some slight burns. Kayser refers the causes of these explosions to the following: If liquid metals are poured into water which is nearly boiling, a great quantity of steam is suddenly generated with a detonating effect, equal to that of gunpowder. The shock produced by the high expansive force of the steam is communicated by the medium of the water toward all sides, as it is, for instance, the case in the blasting of ice with petards. When the sides of the vessel do not possess enough resistance in such a case, they are of course shivered to atoms.

If the water bears an insignificant relation to the mass of the metal it is suddenly converted into steam of a much greater volume, a violent explosion ensuing, as metallurgists can attest sufficiently.

If the water is cool, it absorbs the heat contained in the liquid metal, and no explosion can possibly occur. In granulating metals, they are left to flow in a small stream in a vessel of water, which is constantly kept cool.

In the refining of copper, the plates are immersed vertically in the water, in order that the generated steam may escape in safety; if they should be placed horizontally, explosions would most certainly occur. The pouring of the cooling water upon the surface of the copper in the finery must also be done with particular care.

Perhaps it is well known that all throughout Germany at Andreas Eve (30th November), or at the last day of the year, lead is poured into water, and from the forms which it assumes, future events are foretold. When the water is cool, the lead will disappear with slight hisses, and it will be found afterward in different forms in the bottom of the vessel, but if warm, it may occur that the vessel is shattered with violence.

A Practical Guide for the Perfumer.

The above is the title of a new treatise on perfumery by Professor H. Dussauce, chemist, author of several other practical works of high repute. The book contains a description of the substances used in perfumery, and the formulas of over one thousand preparations, many of which have not hitherto been described. It will prove valuable not only to the manufacturing perfumer but to druggists and dealers. Beside the information contained in the technical portions of the work, we find the following remarks upon the nature of perfumes, and their extreme tenuity which will be of interest to the general reader:

"An odor, in general, is an invisible, imponderable emanation from fragrant substances. Odors cannot be propagated in the same manner as caloric and light; their movements are not submitted to the laws of reflection and refraction. They spread incessantly in the air, which is their vehicle, and follow the currents of the atmosphere.

"The works of distinguished chemists and natural philosophers prove that an odor is produced by very small molecules which are disengaged from odoriferous bodies; these molecules float in the atmosphere, hanging on the different surfaces they meet, communicating to them their properties. When the odoriferous molecules are in contact with the olfactory membrane, the sense of smell is brought into action, and the brain perceives the odor. The olfactory apparatus is then indispensable to the impression of odors. For beings naturally or accidentally deprived of this organ there is no odor, just as no sounds exist for him deprived of the sense of hearing.

"The odoriferous molecules or particles are of such infinitesimal tenuity that the bodies which disengage them all the time seem not to lose anything of their weight, or at least to make insensible losses; and however numerous these particles may be, an exact calculation has shown that one grain of musk had in a radius of ninety feet disengaged, in one day, 56,839,616 particles, without any diminution in its weight This same grain of musk, abandoned to itself for six months in a large garret, communicated its odor to all the objects in the room, and being weighed in an accurate scale, it had experienced no loss.

"A rose, in a few hours, can perfume 10,000 cubic feet of air, without losing in weight.

"A piece of sugar on which a single drop of oil of thyme is poured, and being ground with a little alcohol, communicates the odor of the thyme to 25 gallons of water.

"Haller kept for forty years papers pefumed with one grain of ambergris; after this time the odor was as strong as ever. Bordenave has evaluated a molecule of camphor sensible to the smell to 2,263 584,000th of a grain. Boyle has observed that one drachm of assafœtida exposed to the open air had lost in six days the eighth part of one grain, from which Keill concludes that in one minute it had lost 1-69,120th of a grain, and, by another calculation, he demonstrates that each particle is 2-1,000,000,000,000,000th of one cubic inch. In that calculation, he supposes the particles equally distant in a sphere the radius of which is 5 feet; but as they might be more compressed toward the centre, Keill began again his calculation, and found that in that case it was necessary to multiply by 21 the number of particles, 57,839,616, given above, which produce 1,214,631,936; and he found that the volume of each particle is 38-1,000,000,000,000,0 0,000th.

"The prodigious tenuity of odoriferous molecules made Prof. Walker think that the sensation of odors was not due to the contact of these molecules with the olfactory membrane, but to a dynamic action of the odoriferous body on the smelling sense.

"Dr. Starch, of Edinburgh, has published a paper in which we find some very curious experiments on the emission and absorption of odors. According to his theory, the tissues of animal substances have more affinity for odors than vegetable tissues. The absorption of odors by outward tissues is subject to the same law that governs absorption of caloric, that is, black tissues absorb the most odor; and this absorbing power diminishes, as the color becomes lighter, in such a manner that white tissures are those which absorb odor the least.

"Odors impregnate all bodies in different degrees, and combine with nearly all the liquids. Gloves retain for a long time the perfume of ambergris; paper and cotton, that of musk. Oils and greases retain very well balsamic and volatile principles. Water, and especially alcohol, dissolve perfectly the aromatic principles of flowers. It is on this knowledge that is founded the fabrication of waters, oils, essences, pastes, pomades. Thus the perfume of flowers, so light, so fugacious, is rendered stable by art and industry. At the moment the perfume escapes from the flower, man seizes it, masters it, and uses it to increase the sum of his enjoyment.

"Odoriferous bodies may be so all the time or only at certain periods. Thus some exhale their perfume in the morning, others in the middle of the day, some in the evening, and many during the night. Different circumstances may also cause the intensity of the odors to vary, such as dampness, light, heat, etc; the addition of another substance, also, develops the strength of an odor which, alone, was nearly insensible."

The work is published by Henry Carey Baird, 406 Walnut street Philadelphia, and will be sent to any address free of postage upon the receipt of three dollars.

Woods Used in Cabinet Making.

Mr. Thomas Paterson was one of the working men who visited the Paris Exhibition last year, and ably reported on what he saw there. His report is one of the twelve which compose the little work under the title of "Modern Industries," issued under the auspices of the Paris Excursion Committee. In looking through the magnificent collections of woods from Brazil, Canada, and New South Wales, and the smaller but not less interesting exhibits of Algiers, Natal, Guinea, etc., it is impossible not to be struck, says Mr. Paterson, with the small number of these woods which are in actual use in the manufacture of furniture. Some of the woods are shown to be of large size, and are exceedingly beautiful in color and figure, and many of them would contrast admirably with some of those at present in use.

There was a contribution to the Exposition of specimens of timber, collected by the late Captain Fowke, in which several hundreds of different kinds of wood are arranged in a kind of revolving screen. Each specimen is labeled with its specific gravity, and the amount of weight necessary to break it. Each piece was of the same size—viz., two inches square, and has been actually broken by the weight marked on it, thus giving any one accustomed to work in wood a very good idea of the use it may be put to. Collections of this kind would be of the greatest use. They might be accompanied with a book composed of leaves of the woods, prepared and polished, to show their texture and color, with labels giving the average size of which boards could be cut, the average price, and the market, etc. At present neither artist nor workman is aware of the resources which are at their disposal, and much meretricious ornament would be avoided if this mine of decorative riches were fully explored. In the French colonies department there were some articles of furniture which have been made from the woods of Cayenne, cut by the convicts sent to that settlement.

That a wide and systematic acquaintance with the resources of any country is the first requisite to the development of its trade may be considered an obvious truism; yet in this country, eminently trading and manufacturing, and depending for its greatness upon the growth of its trade and manufactures, no means are taken to make the traders and workers acquainted with the materials which are being wasted in our vast colonies, but which, if known, would be sources of wealth which we can scarcely over-estimate. The staghorn sumac may be mentioned as an example of a very finely veined wood, which seems to be plentiful, and which, though it does not grow to any great size, would be useful in manufacture. The butternut, a kind of walnut wood, grows to a large size, and seems to be very cheap. The kauru (or New Zealand pine), also, a wood to veneer upon, would, I think, be of the greatest value; as well as the heron pine (which is sufficiently handsome to be used without any veneers), the red beech, and many others.

As a new application, or, rather, the extension of an old process in the treatment of wood, the chairs and settees in the Austrian department, made by bending long slips, may be instanced. Some of these chairs were exhibited in 1862. The manufacture has, however, greatly improved since that time. One chair in the Exposition (purchased by the Prince of Wales) was all that could be wished, both as regards strength and beauty. Though no one would wish to see this system of bending wood applied to all articles of furniture so exclusively as it is applied in the manufacture of these chairs, yet the capabilities of the process are well shown, and much might be learned from them. I noticed a method of producing a very good kind of decoration on polished wood by stamping with what is called by chasers a mutt tool, which produces a slighly roughened but regular surface, the pattern being left polished. I observed, also, in passing round the Historical Gallery, a mode of decoration which had an extremely good effect. This was an application of tortoiseshell The under surface or side applied to the piece of furniture had been polished and gilded, the outside surface of the shell being then carefully smoothed and polished, the gold showing through the semi-transparent shell, and giving all its markings, while the shell protected the gilding, so that, though it had been made for more than twenty years, it was still beautiful and effective. It seems to me much to be regretted that some method cannot be devised which would place all such methods of decoration so completely before all our workmen and designers that they might have them, so to speak, at their finger-ends.—*London Building News.*

Kennedy Electric Clock.

An exhibition of this clock, to gentlemen of the press, was made on Wednesday, at the rooms of the company in this city. The clock is impelled by the motion of the pendulum, and is of extremely simple construction. The pendulum ball contains a permanent magnet, which is alternately repelled by oblong helices placed on either side of it at a proper distance. The helices connect with a zinc and carbon earth battery, and the circuit is alternately broken by a commutator attached to the pendulum rod, which is of rosewood, baked, and saturated with paraffine. The clock will run without winding, or any other attention, after the primary adjustments are made. It is said that its regularity and accuracy are superior to clocks of any other construction. We may, at some future time, give a more extended description of this invention.

Editorial Summary.

Work to Line.—We were once acquainted with a cabinet-maker, a true mechanic of the old school, who was noted for his great skill, and his success in business. It was his pride to feel that, when occasion demanded, he could astonish his workmen by the performance of work which would put their best efforts to the blush. We once asked this man, who was a thinker and a philosopher in his way, what he considered the secret of good workmanship in his special craft. His reply was—it is the secret of success in life—"First, carefully lay out your work, then *work to the line.*"

The bones of a gigantic race of Indians have been discovered near Marlboro Point, on the Potomac river. The discovery of a large number of beads, moccasins, etc., leave no doubt of the character of the remains. Further investigations are to be made. The condition of the remains indicate that they must be centuries old.

Two more beautiful frescoes have been found at Pompeii, supposed to be portraits of the master and mistress of the house in which they were discovered. The woman is represented as seated, and preparing to write. The frescoes have been sent to the museum at Naples.

Hippophagy has not met with success in Paris. The government was willing, the *savans* urged the people to eat and set the example, the storekeepers added horseflesh to their stock, but customers were lacking, and there are indications that the movement will be abandoned.

Mistakes will Happen.—An error crept into our Mining and Manufacturing Items, last week, in regard to the amount of lumber shipped from the Saginaw Valley. Instead of four hundred, it should have been four hundred millions of feet.

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STARVATION IN THE RED RIVER COUNTRY.—Accounts from the Red River region indicate that the ravages caused by the grasshoppers, render famine imminent. The St. Paul *Press* says: "Nothing but the most prompt and most energetic measures, prosecuted upon the largest scale, can avert from the people of Red River the most awful calamity of modern times." It adds "that the time for obtaining relief is extremely short, as within a few weeks the people may be walled in by five hundred miles of snow from any possible aid except what they may dribble through on dog trains."

ARTIFICIAL MAGNETIC OXIDE OF IRON.—M. Sidot has communicated to the Academy of Sciences a paper "On the Artificial Production of Magnetic Oxide of Iron." This he does by introducing a small platinum disk, filled with colcothar, into a porcelain tube, situated in a direction parallel to that of a dipping needle. After keeping the tube at a temperature a little below a white heat for about an hour, the colcothar will be found transformed into a gravish metallic oxide, the particles of which are strongly agglomerated together. This mass possesses the property of polar magnetism.

AMERICAN RIFLES FOR FOREIGN GOVERNMENTS —We hear that the Remingtons, of rifle notoriety, have built for the Swedish government 30.000 of their rifles and nearly completed an order for 40,000 for the Danish goverment. It is said, also, by our informant, that the Chassepot, not proving all that was expected, the French government are about to contract for a large number of the Remingtons adapted to the French rifles, the Remington breech being preferred.

THE following professors of Cornell University have been elected: Rhetoric and Oratory, H B. Sprague, principal of State Normal School of Connecticut; General and Agricultural geology, Prof. C. Frederick Hart, of Vassar College; Botany and Horticulture, Prof. A. N. Prentiss, of Michigan Agricultural College; Director of Shops, John L. Morris, of Ovid. The University opens October 7th.

THE following is one of the many good things from Dickens's pen: "The first external revelation of the dry rot in men is a tendency to lurk and lounge; to be at street corners without intelligible reason; to be going anywhere when met; to be about many places rather than any; to do nothing tangible but to have an intention of performing a number of tangible duties to-morrow or the day after."

THE Sicilian Railway Company not long since bought, in Catania, for the purposes of its business, a house two stories high, formerly belonging to the Jesuits. The workmen, in demolishing the walls of the building, found a cavity, within which were three human skeletons, still having the decayed fragments of priests' cassocks clinging to them.

WE have seldom seen more sense compressed into less space, than is contained in the following sentence, by Josh Billings: "I am loadly in favor ov new things, but I am oppozed to enny man, even wun ov our colored associates, thinkin' he has diskovered a new truth jest bekause he haz, for the fust time in his life, stumoled into an old one."

The codfish has been elevated to the dignity of oysters and strawberries, and is now canned for use. It is prepared by clearing it of skin and bone by desiccation. One Philadelphia concern puts up three tuns daily.

THE safe of the Adams Express Company, which was sunk with the steamer W. R. Carter in the Mississippi river about two years ago, has been recovered. It contained $230,000 in national currency, all of which has been regained without serious damage.

THE American Institute has decided to hold no Fair this year. The want of a suitable building is the reason.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING SEPTEMBER 22, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American. New York.*

82,268.—REED FOR MELODEON.—Rogers A Abbott (assignor to himself and Gustavus W. Ingalls), Worcester, Mass.
I claim the improved reed, as made with an arched head as and for the purpose specified.

82,269.—HEAD BLOCK.—Abel A. Adams, Felchville, assignor to Russel W. Pinney, and Forrest L Pinney, Bridgewater, Vt.
I claim the combination of the sector, s, its adjustable stop, u, and hinged stop pawl, x, with the gear, o, its operating lever, p, working pawl, q, and abutment, y, the same being applied to the bed, and to the shaft of the rack pinion of the main head block, substantially in manner and for the purpose or objects as set forth.

82,270.—STEAM SAFETY VALVE.—Edward H. Asheroft, Lynn, Mass.
I claim the construction of the valve, b, with its alloy, t, with reference to its seat, s, as an article of manufacture, substantially as herein set forth.

82,271.—CLAMP FOR RAILROAD RAIL.—William B. Atkinson, Pittsburg, Pa. Antedated September 9, 1868.
I claim the T-headed bolt or pin, D, plate, C, and wedge or key, F, combined and applied to the securing of a guard-rail, substantially as herein set forth.

82,272.—PENCIL SHEATH.—Samuel Ayres Danville, Ky.
I claim, 1st, The combination of the slotted funnel-shaped holder, A, spring, C, and friction roller, D, the perforated wings, E, and the adjustable protecting tube, G, having the perforate diaphragm, g2, all constructed and arranged as described, for the purpose specified.
2d, In combination with the slotted funnel-shaped holder, A, roller, D, and protecting tube, G, the adjustable stop, F, upon the pencil as herein described, for the purpose specified.
3d, The combination of the protecting tube, G, with the holder A, constructed substantially as herein shown and described, and for the purpose set forth.

82,273.—PRODUCTION OF GAS, AND ILLUMINATING STREET AND OTHER CARS.—Arthur Barbarin, New Orleans, La.
I claim 1st, The method of generating illuminating gas on railway or street cars, or other conveyances, by the use, in such conveyances, of one or more reservoirs or tanks of compressed air, operating in connection with a carbureting vessel and burners, for the consumption of the carbureted air, substantially in the manner herein set forth.
2d, A burner for carbureted air, the slit or opening in which for the discharge of said air is formed substantially as shown and described.

82,274.—HORSE YOKE.—Thomas J. Barnes, Cambridge, Ill.
I claim, 1st, Connecting the parts, A and B, of the yoke to the hames, F, by means of the clips, G, constructed and attached to said hames, substantially as herein shown and described.
2, Forming holes or slots in the ends of the parts, A and B, of the yoke, to adapt them to the clips, G, substantially as herein shown and described.
3d, Bending or curving the curved portions of the parts, A and B, downward, as they leave the clips, G, substantially as herein shown and described and for the purpose set forth.
4th Beading or curving the straight portion of the part, A or B, which is below the other, at an angle of said part, and at the point where it leaves the clip, G, substantially as herein shown and described, and for the purpose set forth.
5th, Connecting the short chains, C, and equalizing bar, D, to the eyes of the parts, A and B, by means of hooks, substantially as herein shown and described, and for the purpose set forth.
6th. The single draft chain, E, attached to the center of the equalizing bar, D, when said chain is used between the horses, as and for the purpose specified.

82,275.—BURGLAR ALARM.—Henry P. Beardsley and Geo. Wilcox, Corunna, Mich.
We claim, 1st, The water cylinder, N, provided with the opening, O, and perforations P, in connection with the clock-work, C.
2d, The casing, R, provided with openings, S, when operating with the water chamber, substantially as described, for the purposes specified.
3d, The combination and arrangement of the bed plate, A, standard, B, cord or cords, V, loop, U, springs, L and M, rod J, cord, G, loop, I, lever, H, rock shaft, D, weighted lever, T, dog E, and catch, F, with the clock work, C, water cylinder, N, and casings, R and K, all operating in the manner specified, and for the purposes set forth.

82,276.—REGULATOR FOR STEAM-ENGINE.—Julien Francois Belleville, Paris, France.
I claim the arrangement, in the cylinder, F, provided with steam admission and discharging openings, as described, of the spindle, C, and annular spring disks, A, mounted upon the said spindle, and united or riveted together in the manner specified, and provided at the points where their outer and inner edges are in contact with a packing, B, as set forth.

82,277.—SPARK ARRESTER FOR STEAM GENERATOR.—Walter C. Benn (assignor to himself L. L. Baker, and R. Hamilton), San Francisco, Cal
I claim, 1st, The stack or chimney, A, with the curve, a, as shown, and the water vessel, C, together with the supply and discharge pipes, b b and d, the whole constructed and arranged substantially as herein described.
2d, The secondary bonnet, D, and the annular water trough, E, as arranged, for more completely extinguishing the sparks, substantially as described.
3d, The conical vessel, C, and bonnet D, movable in the slides, c c', e, for regulating the draft, the whole constructed and arranged substantially as herein described.

82,278.—MILLSTONE BALANCE.—Walter C Benn (assignor to himself, Livingston L. Baker, and Robert Hamilton, San Francisco, Cal.
I claim the combination of the adjustable weights, D D, and their ways, C C, together with the operating screws, E E, and the elevating screws, b, b, or an equivalent device, when used for balancing millstones, the whole constructed and arranged substantially as herein described.

82,279.—COMBINED PISTOL AND SWORD.—Charles E. Billings, Springfield, Mass.
I claim, 1st, The construction of the lower guard of the sword hilt, and the pistol barrel in one and the same piece, and pivoting the same to the extreme forward end of the handle, substantially as and for the purpose set forth.
2d, The combination of the main lock spring, C, of the pistol with the shank of the knife, when the former is secured in a slot in the latter, as and for the purpose described.
3d, The arrangement with the knife handle and pistol hammer, of the trigger lever, D, extending the length of the handle, and having a thumb trigger at its forward end, substantially as shown and described.

82,280.—CLOTHES DRYER.—Josiah B. Blood, Lynn, Mass. Antedated September 12, 1868.
I claim the combination of the strips, A B C D E F, forming the frames, in the manner and for the purpose substantially as above set forth.

82,281.—KNITTING MACHINE.—Benjamin Bollinger and George G. Nodle, New Berlin, Ohio.
We claim the spring K N, constructed as described, in combination with a needle of a knitting machine, substantially in the manner and for the purpose herein specified.

82,282.—LAND MARKER.—Wesley L. Bower, Joliet, Ill.
I claim the combination of the swing seat, m, and upright frame, l, with the hinged frame, e, all arranged and operating as and for the purposes set forth.

82,283.—STEAM GENERATOR.—H. G. Brooks, New York city.
I claim, 1st, The arrangement, in the fire-box of a locomotive or other boiler, of perforated fire brick walls, extending upward divergingly from the contracted grate surface to the walls of the fire box, substantially as set forth.
2d, The arrangement, in the upper part or mouth of the combustion chamber or fire box, of arched or hollow perforated fire brick, or castings of fire clay, communicating with air conduits in the manner described, so that the atmospheric air received through such conduits may be highly heated within said brick or castings, and then discharged from the same into the combustion chamber at the point of contraction and concentration of the combustible gases evolved from the fuel in the fire box.
3d, The combination, with the perforated fire brick, of a water supply pipe, communicating with the boiler, and provided with a series of nozzles or sprayers, arranged partly within the perforations in the fire brick, substantially as set forth.

82,284.—PROJECTILE.—Charles F. Brown, Warren, R. I.
I claim, 1st, The tube, B, and plunger, C, arranged within the hollow projectile, A, the plunger serving to separate the powder in the shell from the fuse in the tube, while the shell is undisturbed in its motion, as specified.
2d, The wire, b, formed on the plunger, for the purpose of becoming heated by the ignited fuse, and for igniting the powder or other explosive matter in the shell, as soon as the latter strikes an obstacle as specified.
3d, The tube, B, fitted into the hollow shell, A, and provided with apertures, c, with a perforated plug, d, or its equivalent, and with a fuse, g, all arranged in combination with the plunger, C, which carries the wire, b, and all made and operating substantially as herein shown and described, for the purpose specified.
4th, The perforated cap, E, fitted over the rear end of the tube, B, substantially as herein shown and described.
5th, The combination of the shell, A, tube, B, plunger, C, and wire, b, with the case, D cap, E, and apertures, K, all made, arranged, and operating substantially as and for the purpose herein shown and described, for the purpose specified.
6th, The rod, I, in combination with the tube, B, plunger, C, and wire, b, all made and operating substantially as herein shown and described.

82,285.—ROTARY STEAM ENGINE.—Arthur W. Browne, Brooklyn, N. Y., assignor to Charles B. Squire, New York city.
I claim, 1st, The arrangement of the abutment, E E', pressure chamber, C, and the cocks, D and D'.
2d, The pistons, G, when constructed as set forth.
3d, The construction of the segment, H H', forming the chamber through which the piston passes while being acted upon by the steam, as herein set forth.
4th, The arrangement in the shell of the rotary engine of the abutments, E E', pressure chamber, C, and segments, H H', substantially as set forth.

82,286.—MOP HEAD.—John D. Browne, Cincinnati, Ohio.
I claim the fixed jaw, A, having the grooves or recesses, c c, on the socket, B, in combination with the loose jaw, D d d, and nut, C, substantially as and for the purpose described.

82,287.—SASH PULLEY.—John D. Browne, Cincinnati, Ohio.
I claim the recessed lugs, a, of the face plate, A, in combination with the holding pins or rivets of the case plate, B, in the manner substantially as described, and for the purpose set forth.

82,288.—HAY RACK.—Stephen Brownell, Irving, N. Y.
I claim the combination of the separate bed plates, A, with projecting pins, a a, secured thereto, separate angular cross pieces, B B, with projecting pins, b b, secured thereto, separate side rails, C, and separate center board, D, the parts being built up one above another, and connected together, and adapted to operate as herein represented and described.

82,289.—SAW.—Benj. F. Burgess, Norvell, Mich.
I claim making a saw that is to cut one way only, with the cutting teeth, B and C, and the clearing tooth, D, forward of each section, and the space, E, when constructed and all arranged as specified.

82,290.—PRUNING AND HEDGE SHEARS.—Lawrence Campbell, Marengo, Mich.
I claim the cutting blades, C and J, the latter provided with cutting hook, K, when constructed as described, and operating in combination with the handles, B and E, and connecting arm, F, substantially as and for the purpose set forth.

82,291.—BELT BUCKLE.—F. Clausen, San Francisco, Cal.
I claim, in a belt buckle, the beveled projecting lip, B, in combination with the slotted bar, C, rotating on its axis, as shown, and the operating lever, b, the whole constructed and arranged substantially as and for the purpose described.

82,292.—HORSE RAKE.—Wm. H. Cook, Bridgehampton, N. Y.
I claim the combination of the standard, H, lever, I, and perforated shoe, K, with the rake head, F G, substantially as herein shown and described, and for the purpose set forth.

82,293.—POST HOLE BORER.—John Cothron (assignor to himself and D. J. Mayes) Rhopolis, Ill.
I claim the shaft, K, knife, M, belt, N, with its buckets gears, o m p, and their shafts, and frame to which they are attached, wheel, a, windlass, b, with its connecting rope, g, frames, E and A, of a post hole borer, all constructed arranged, and operated substantially as and for the purpose specified.

82,294.—DOOR FOR FURNACE.—Wm. W. Crane, Philadelphia, Pa.
I claim the door plate, B, rim or elevation, A, and the door, C, when constructed and arranged substantially as and for the purpose shown and described.

82,295.—WINDLASS.—Augustus Day, Detroit, Mich. Antedated Sept. 16, 1868
I claim, 1st, the friction bands, G, in conjunction with the pawls, F, the rod thereof as described, and the cylinder, B, when operating substantially as and for the purposes set forth.
2d, The dogs, H, rod, I, and counterpoise, J, when arranged and operating substantially as herein described.
3d, The combination and arrangement of the above mentioned parts with the frame, A, the cylinder, B, the sockets, C, the handles or levers, D, the ratchets, E, and the chain or rope, K, when constructed and operating substantially as herein specified, set forth and described.

82,296.—MACHINE FOR CONVERTING RECIPROCATING INTO ROTARY MOTION.—Jacob G. Deshler, Allentown, Pa.
I claim the combination, in a man power machine, of the vibrating footboard, A, the trunnions of which have rectilinear bearings, substantially as described, with the pitman beams, B, pitman, D, and crank shaft, b, all arranged and combined substantially as shown and described for the purpose set forth.

82,297.—LANTERN.—Anthony M. Duburn, Chicago, Ill.
I claim, 1st, The sheet metal rim, A, when formed in the shape shown and described, and for the purpose herein set forth.
2d, The wire ring, B, when used as a stiffening, in combination with the sheet metal rim, A, and corrugations or loops, c c c c c.

82,298.—BEE HIVE.—George Eason, Lyons, N. Y.
I claim, 1st, The box, A, provided with the porch, B, swinging side, E, comb frames, C, and division board, D, all as and for the purpose set forth.
2d, The arrangement of the ventilating passages, N, L, and b, the latter being covered with a wire screen, as and for the purpose described.

82,299.—HAND SAW.—James E. Emerson, Trenton, N. J.
I claim a shouldered and headed screw bolt for holding a saw to its handle, so that said screw bolt may be held from turning under the action of the nut, and constructed to operate as and for the purpose herein described and represented.

82,300.—CAR SPRING.—James W Evans, New York city.
I claim the spiral spring, A, the elastic tube, B, and the closed air chamber confining the column of air, D, constructed and combined substantially as and for the purposes specified.

82,301.—CONCRETE BLOCK MAKING MACHINE.—Owen V. Evans (assignor to himself and James Reynolds), Ripley, Ohio.
I claim, 1st, The combination with the table, B, of the disk, O, and slide, F, oscillating toothed segment, M pinion, P, and rack, Q, substantially as and for the purpose described.
2d, The combination of the mechanism for operating the sliding pistons, D, with the mechanism for rotating the table, B, when the same are arranged to operate relatively to each other substantially as and for the purpose described.

82,302.—WHIP GOAD.—Frederick Flanders, Franklin, N. H.
I claim the whip stock, metallic tip, B, hollow screw, C, spur, c, and screw D, when combined and arranged as and for the purpose described.

82,303.—MACHINE FOR FELLING TREES.—M. R. Fory, New York city.
I claim the frame, B, carrying a series of permanent and a series of detachable augers, and constructed and adapted to the truck, A, as and for the purpose described.

82,304.—BABY WALKER.—Frederick A. Geisler, Bristol, R. I.
I claim the oscillating yoke, G, made in two parts, a b, the former pivoted by the bolt, d, to the curved arm, F, and provided with a socket, in which the shank of the arm, b, is adjusted by the set screw, c, as herein described, for the purpose specified.

82,305.—BEDSTEAD FASTENING.—Chas. M. Gilbert, Philadelphia, Pa.
I claim the combination of a key or wedge, 2, with the bolt, 1, tube or barrel, 5, spring, 3, slotted rail, 4, and post, 6, as hereinabove described.

82,306.—KNIFE FOR CUTTING GREEN CORN FROM THE COB.—Washington L. Gilroy, Philadelphia, Pa.
I claim, 1st, A green corn knife for table use, having a blade, A, provided with a series of transverse cutting edges, a' a', substantially as described
2d, In combination with a blade, A, and cutters, a' a', arranged as described, the bar, B, arranged to operate substantially as and for the purpose described.

82,307.—WIND WHEEL.—B. H. Goodale, Newburyport, Mass.
I claim the combination, with the hinged wings, of means, substantially as described, for folding the sails, as and for the purpose described.

82,308.—MAT.—John M. Groh, Benevola Md.
I claim the mat constructed as described, consisting of the wooden block, A, having an interior groove adapted to receive the filled bars through the notch, a, in the flange of said block, as herein described, for the purpose specified.

82,309.—MANUFACTURE OF BROMINE FROM BITTERN.—Gustav A. Hagemann, Natrona, Pa.
I claim, 1st, The use, in the manufacture of bromine, of a sandstone trough or vessels, furnished with a bore, C, for the introduction of steam, so as to dispense with the insertion into the liquor of metallic pipes.
2d, The use, in the process of extracting bromine from bittern or mother water, of naked steam, introduced into the body of the liquor under treatment, for the purpose of combining the mechanical action of the steam with the physical effects of its heat, to produce the desired effect.

82,310.—TRUNK CASTER.—J. W. C. Haskell and Joseph E. Haskell, Chicago, Ill. Antedated Sept. 11, 1868.
We claim the plate, A a, provided with the hole, d, for the projection of a caster ball, and made angular, so as to form a guard for the trunk corners, in combination with the plate, b c, and ball, e, substantially as specified.

82,311.—RANGE.—John P. Hayes, Philadelphia, Pa. Antedated Sept. 8, 1868.
I claim, 1st, The construction and arrangement of the tunnel, B, in its relation to the cylinder, A, and the air heating chamber, C, whereby the air for the combustion of the fuel in the cylinder can at any time be drawn from the air heating chamber, C, substantially as and for the purposes described.
2d, The construction and arrangement in relation to each other of the tunnel, B, the detachable sliding grate, E, and the adjustable opening, c'', in the plate, c', into the ash pit, D, substantially as and for the purposes described.
3d, The construction and arrangement of the air heating flue, F, in relation to the cylinder, A, the air heating chamber, C, the cold air space, M, and the oven, G, substantially as and for the purpose described.

82,312.—HENS' NEST.—B. F. Hayward, Nebraska City, Nebraska.
I claim the nest box, C, pivoted bottom board, D, link, b, levers, E, and grating, d, all constructed and operating substantially as described, within a box, A, all as set forth.

82,313.—FURNACE FOR WORKING IRON.—John Heatley, Etna, Pa.
I claim, 1st, an air chamber, g, under the bottom plate of a heating or puddling or boiling furnace, provided with such communications as to receive air from without, heat it, and discharge it into the furnace, fire space, or ash pit, substantially as and for the purposes hereinbefore set forth
2d, The use or two or more dampers, h h, so arranged relatively to the air chamber, g, and lower grate, c, as to admit heated air either above or below such grate, c, or both above and below, substantially as and for the purpose above expressed.
3d, A perforated plate or finely divided grate, c, at any desirable point below the fire grate, a, and above the bottom of the ash pit, arranged and used substantially as and for the purposes hereinbefore set forth.
4th, The series of flues, e e', extending along the face of or through the lining or walls of a heating, puddling, or boiling furnace, arranged and used substantially as and for the purposes described.
5th, A fire box, of covering the tap hole, n, of a furnace, constructed and operated substantially in the manner and for the purposes hereinbefore set forth.

82,314.—CENTRIFUGAL MACHINE.—S. S. Hepworth, Boston, Mass.
I claim, 1st, The suspension of the shaft, B, and curb, A, of a centrifugal machine, from a sleeve, a, or other equivalent device, substantially as shown and described, and for the purposes set forth.
2d, Supporting the sleeve, a, by the spherical surfaces, a' and l', or surfaces approximating to a spherical surface, for the purpose of supporting and permitting the vibration or gyration of the basket shaft, B, of a centrifugal machine, all as set forth.
3d, Supporting the sleeve, l, or its equivalent, by a bolt, d, or the equivalent thereof, substantially as shown and described, when these said parts conduce to the support of the basket shaft B, of a centrifugal machine, all as set forth.
4th, The bolt, d, and cam link, h, or their equivalent, in combination with the sleeve, l and m, all substantially as shown and described, and for the purpose of indirectly supporting the weight of the basket shaft, B, of a centrifugal machine, and elevating the said shaft to produce the contact of the breaking surfaces, c and m', all as set forth.
5th, Employing the pulley, C, and lower end of the sleeve, m, as friction surfaces, for the purpose of retarding and stopping the revolution of the basket shaft, B, of a centrifugal machine, all as set forth.
6th, Making the surfaces, c and m', spherical, for the purpose of permitting the gyration of the basket shaft, B, all substantially as shown and described.
7th, Two or more rods, E, or the equivalent thereof, substantially as shown and described, in combination with arms, G, and curb, A, for the purpose of supporting the curb, A, and thereby enabling it to maintain its concentricity with the shaft, B, all as set forth
8th, The gudgeon, b, affixed rigidly to the cross bar, f, or other equivalent bottom part of the curb, A, substantially as shown and described, in combination with a roller, r, and cup, J, or its equivalent, as and for the purpose set forth.
9th, The employment of an elastic roller, r, substantially as shown and described, in combination with the fixed gudgeon, b, or other equivalent device, and cup J, or its equivalent, all as and for the purpose set forth.

82,315.—PROCESS OF EXTRACTING PRECIOUS METALS FROM ORES, ETC.—George P. B Hill, Virginia city, Nevada.
I claim the ingredients above enumerated, mixed or compounded and added to the ores, pulp, tailings and slimes, in about the proportions herein specified for the purpose set forth.

82,316.—HAY RAKER AND LOADER.—William H. Hiteshew, Perrysburg, Ind.
I claim the teeth, D, constructed with arms, d', and wheels, E, and operating substantially as herein shown and described, and for the purpose set forth.

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82,317.—ARRANGEMENT OF MECHANISM FOR OPERATING PUNCHES.—Luther W. Holmes, Grand Ledge, Mich.

I claim the construction and arrangemen tof frame or standard, A, with its guide pieces, D and E, sliding stirrup, C, with sliding pin, G, cam lever, L H, roller, I, and bed plate, in the manner as shown and described, and for the purpose set forth.

82,318.—STILL.—Nicholas Hotz, Green Point, N. Y.

I claim, 1st, The process, substantially as herein described, of effecting continuous redistillation within a still, through, it may be, the action of a single heater or generator, by causing the vapor rising from the one distillation to be condensed within the mash through a worm or worms, or their equivalents arranged therein, and afterward returned for distillation over again, thus separating the more from the less highly volatile portions, and at the same time heating the mash.

2d, The combination of the mash receiving chamber or vessel, A, with the mash vessels, D G, and H, and pipes, C F, and J, provided with suitable plugs or valves, for passage of the mash to each of the lower vessels in succession, substantially as specified.

3d, The combination, with any desired number of mash chambers or vessels, A D and G, and mash receiver or generator, H, of two or more distilling chambers or separators, N K, arranged to connect by pipes with worms or other condensing devices, located in the mash vessels, A D and G, for operation, essentially as described.

4th, The connection of the distilling vessels or separators, N and K, by means of an overflow pipe or pipes, n and r, substantially as and for the purpose or purposes set forth.

5th, The combination, with the mash boiling vessel or generator, H, of the column, L, arranged to connect with a worm, or its equivalent, in an upper mash vessel, essentially as herein set forth.

82,319.—VELOCIPEDE.—David Hunt, Jr., Worcester, Mass.

I claim, 1st, The combination of the seat, G, with the braces or standards, H H, and the crank or supporting shaft, A, substantially as and for the purposes set forth.

2d, The peculiarly constructed frame, D, in combination with the cap, E, axle, A, and chair, G, substantially as and for the purposes set forth.

3d, The combination of the standards, H H, and piece, P, having ears, a a, with the chair seat, G, and frame, D, substantially as and for the purposes set forth.

4th, A velocipede, the parts of which are constructed and combined together, substantially as shown and described.

82,320.—WOOD PAVEMENT.—David Woodwell Hunt, San Francisco, Cal.

I claim a pavement, the blocks of which are secured in position by means of cement run into horizontal grooves or recesses cut around each block, the blocks and grooves being formed and arranged substantially as described.

82,321.—OIL CUP.—Edwin Hurd, Virginia city, Nevada.

I claim the arrangement of the frame, E, the hollow cylinder, a, pivoted within it, and having passages for the reception of oil, for the escape of air, and for the delivery of the oil through the pivots on which it turns, substantially as described.

82,322.—HEATING APPARATUS.—J. Rienzi Jenness, Norwich, Conn.

I claim, 1st, The steam space or spaces, D, between the several chambers and dishes, B B, substantially as described, and for the purposes set forth.

2d, The vessel or table, A, chambers, C, and space, D, with induction and eduction pipes, pans, B, and covers, O, when combined and arranged substantially as described, and for the purposes set forth.

82,323.—NECK TIE.—Asa Johnson, Brooklyn, N. Y. Antedated Sept. 11, 1868.

I claim a neck tie formed of wire cloth or gauze, substantially as described, as a new article of manufacture.

82,324.—CAR BRAKE.—G. N. Jones, Oshkosh, Wis.

I claim, 1st, The combination, with the friction pulleys, of the shaft, I, connected from car to car, as described, and slides, L, connected to the sliding pulleys by a cord and lever, for actuating them, substantially as and for the purpose described.

2d, The combination of the slides, L, actuating shaft, and means for allowing the slides to pass out of action, with the shafts, when the brakes are brought into action, substantially as and for the purposes described.

3d, The combination, with the slide, L, of the collar, P, lever a, slide, U, and catches, C and C', substantially as and for the purpose described.

82,325.—FIRE ESCAPE.—J. L. Jurgens, New Orleans, La.

I claim the carriage, A, provided with the adjustable grooved pulleys, B, and operating shaft, D, in combination with the inclined ways, E E, substantially as and for the purpose described.

82,326.—HYDRANT.—Wm. Kearney, Union Township, N. J.

I claim the arrangement and operation, in the case, A, of the sliding disk valve, C, perforated at S, and the sliding waste pipe, J, as herein shown and described.

82,327.—STOVE.—J. H. Keyser, New York city.

I claim, 1st, The combination of sections, A and B, the latter constituting the fire chamber, and the former an illuminating and heat retaining top section for B, substantially as described.

2d, The construction of section, A, with an internal downwardly-contracted wall, c, with inclined illuminating window, d, and with downwardly-contracted base portion, a, said parts being adapted to fit upon a fire-pot section, B, substantially as described.

82,328.—HEAD BLOCK.—W. A. L. Kirk, Hamilton, Ohio.

I claim the index roller, D, constructed substantially as herein shown and described, in combination with the head block, B C, of a saw mill, as and for the purpose set forth.

82,329.—CAR-BRAKE ATTACHMENT.—J. Kirkley, Chicago, Ill., assignor to himself and Hugh Gray.

I claim, 1st, A guard box, F, adapted for inclosing the pawl and ratchet of a brake standard, substantially as described.

2d, The combination of a treadle, E, pawl, H, and ratchet wheel, D, substantially as described.

3d, Fitting the treadle, E, to the guard box, F, substantially as herein described.

4th, A spring latch, g2, a pawl, H, ratchet wheel, D, a treadle, E, and means, substantially as described, for releasing the latch, g2, by the act of turning said ratchet wheel.

82,330.—SKIMMER FOR SORGHUM EVAPORATOR.—J. B. Lewis, Lincoln, Ohio.

I claim, 1st, The automatic skimmer lid, B, formed by attaching the perforated metallic plate, b1, constructed as described, and having pipes, b2, inserted in it to the wooden frame of said lid, substantially as and for the purpose set forth.

2d, The combination of the automatic skimmer lid, B, constructed as described, with an ordinary evaporating pan, A, substantially as and for the purpose set forth.

82,331.—PISTON-ROD PACKING.—Samuel Lockard, Lagrange, Indiana.

I claim the arrangement, within the chamber, K, of the conical split packing rings, e f, flanged follower, g, and spring, d, as herein shown and described.

82,332.—GOVERNOR FOR STEAM ENGINE.—J. A. Lynch and R. K. Huntoon, Boston, Mass.

We claim the combination of the hydraulic governor and a mechanism, substantially as explained, for effecting the closing of the main valve of the engine, in case of breakage of the driving belt of the governor, such mechanism consisting principally or in substance, not merely of the auxiliary arm, L', the catch, m, and chain, N', but also of the slide or disengager, n, the spring, r, lever catch, s, and the arm, z, provided with the bolt, c2, or such bolt and the spring, b2, the whole being applied to the said arm, K1, the governor case, and the weight, W, substantially in manner and so as to operate as specified.

Also, the combination of the hydraulic governor and the relay or reinforcing engine applied to the main valve, S, of the induction pipe of a steam engine, as set forth, with the described mechanism for effecting the closing of the said main valve in case of breakage of the driving belt of the governor.

82,333.—COFFIN.—M. R. Margerum, Trenton, N. J. Antedated Sept. 9, 1868.

I claim the forming and constructing the side and rounded head of wooden coffins with two entire pieces of wood, and bending the same so as to form the coffin, substantially as above described and herein set forth.

82,334.—LAMP BURNER.—J. P. McGee, Trenton, Tenn.

I claim the burner, B, having its lower end slitted to form a series of springs g, provided with a head, h, which is adapted to press in the springs when the burner is inserted in the cylinder, f, the expansion of said springs forcing the head under the lower edge of the cylinder, when it has cleared the same, thereby holding the burner in place, as herein shown and described.

82,335.—PINKING TOOL.—John L. McIntosh, Boston, Mass., assignor to himself, James Blenkinsop, and Wm. H. Vaughn. Antedated Sept. 7, 1868.

I claim a machine or device for pinking leather, cloth, etc., consisting of a lever, armed at one end with a tool and a tool-bearing socket, the latter so arranged as that the pinking tool may be changed at pleasure, in combination with the revolving block, when the same is supported and made adjustable by a spring beneath, all substantially as and for the purpose described.

82,336.—GATE.—A. W. Meek, Waterloo City, Ind.

I claim the rack, K, pulleys d and e, and weight, l, in combination with the gate, G, substantially as and for the purpose described.

82,337.—SIDE SADDLE TREE.—John C. Miller, Danville, Ky.

I claim, 1st, As a new article of manufacture, of a side saddle tree, in which the front or pommel, c', is formed at the same time and of a similar material to the body of the tree, substantially as and for the purpose specified.

2d, The combined off horn and pommel, C, formed from wood with the grain lengthwise, by cutting, steaming, and bending, and attached, substantially in the manner described.

82,338.—ROW LOCK.—P. H. Mills, Green's Landing, Me.

I claim the row lock, D, and roller, C, constructed and operating in combination with each other, substantially as herein shown and described, and for the purpose set forth.

82,339.—GRAIN STORER.—R. M. Mitchell, Fort Atkinson, Wis.

I claim, 1st, The arrangement of the bins, A, in a vertical column, said bins being connected by means of a tube, B, provided with receiving and discharging orifices, E F, respectively, substantially as described for the purpose specified.

2d, The tube, B, passing through the series of bins, A, and provided with receiving and discharging orifices, communicating with each bin, said orifices being provided with valves which are adapted to be operated by means of cords, D, or their equivalents, in the manner and for the purpose substantially as herein set forth.

82,340.—SPRING FOR WAGON SEAT.—John H. Nale and John W. Rogers, Decatur, Ill.

We claim a spring seat for wagons, composed of reversible cross spring braces, supported by and in turn supporting the seat by a bridge piece at or near their points of crossing, substantially as herein described and represented.

82,341.—CLOTHES PRESS.—J. S. Nicholson, Anamosa, Iowa.

I claim, in a clothes press, the combination and arrangement of the frames, A and B, uprights, 1 and 2, cross piece, 3, shelf, 4, the coverings, 5 and 5, the arms, a b and c, the bars, e f and g, the rest, h, as and for the purpose specified.

82,342.—VALVE GEAR FOR OSCILLATING ENGINE.—Charles H. Overton and D. B. Overton, Dover, N. J.

We claim the arrangement of the hoop, G, reciprocating plate, E, and guide plate, d, with reference to the trunnion, a, of an oscillating cylinder, substantially as shown and described.

82,343.—WAGON.—Alvah Pate and Edgar Wilber Pate, Nankin, Mich.

We claim the construction of a wagon or carriage, combining the springs, D, body, E, semi-circular frame, H, roller, I, hanger, J, circle, K, "fifth wheel", L, and king bolt, M, or their equivalents, with any suitable axles, B, and wheels, A, when arranged, connected, and operating substantially as and for the purposes herein set forth and shown.

82,344.—WAGON BRAKE.—David Philips, Cordova, Ill.

I claim a brake, consisting of the shaft, D, having rub blocks, attached, held in by the rods, F, and operated by the lever, C and H, connected by the rod, G, substantially as described.

82,345.—HORSE RAKE.—C. H. Poage, Perry, Mo.

I claim the combination of the staples, e', and rings, e, with the rake, a b c d, and the flexible draft chains or cores or straps, g g, substantially in the manner and for the purpose described.

82,346.—MACHINE FOR CUTTING SCREW THREADS.—Denis Poulot, Paris, France.

I claim, 1st, The arrangement herein described, of the perforated rotating and sliding jaws, D, plate, C, and hollow shaft, B, with mechanism for rotating the same.

2d, In combination with the above specified mechanism, the guide rods, i, and sliding die carriage, H, constructed and operating substantially as described.

3d, The arrangement, in the die carriage, of the cutting dies, k, and sliding blocks, l, in combination with the screws, gearing shaft, and hand wheel, for operating the same, so that said dies can be moved simultaneously, either toward or away from each other, as set forth.

4th, The inclined and projecting trough or receptacle, located beneath the cutting mechanism, and arranged to receive the shavings or chips and lubricating oil, and to conduct the latter to a separate receptacle, as herein shown and described.

82,347.—MACHINE FOR MOLDING CANDY.—E. K. Powers, Grand Rapids, Mich.

I claim, 1st, The movable molds, B, constructed each of a bottom piece, a, and a vertical side strip, b, sharpened at its upper edge, in combination with the roller, G, and the mold's receptacle, A, all of which may be constructed of wood or any other material, and arranged substantially in the manner as and for the purpose set forth.

2d, The press, composed of the bars, K K', arranged and operated substantially as shown, in combination with the plunger or follower, L, box, M, the slide, N, and spring stop, O, all arranged for joint operation, substantially in the manner as and for the purpose specified.

82,348.—KNITTING MACHINE.—J. W. Rist (assignor to himself and Ira A. Hebbard), Rochester, N. Y. Antedated September 9, 1868.

I claim, 1st, The needle bed, composed of the division plates, d, and spacing plates, t, when connected together, substantially in the manner and for the purposes herein shown and described.

2d, The gib, G, in combination with the bed, A', and removable needle bed, as and for the purposes set forth.

3d, The arrangement of the locking spring, N, constructed as described, attached rigidly to the lock plate, P, and operating upon the V-shaped cam, M, on the reversing plate, H, substantially as and for the purposes set forth.

4th, The arrangement of the cam, Q, with the pivoted lever, R, and stud, g, of the wing cam, D, on that end of the lock, substantially in the manner and for the purposes herein shown and described.

5th, The arranged of the cam, O, upon the reversing slide, in connection with the stud, g, of the wing cam, the parts all operating substantially in the manner and for the purposes shown and described.

6th, The reactionary spring, l, in combination with the stud, g, and wing cam, D, substantially as shown and described and for the purposes set forth.

7th, The combination with lock plate, P, of the needle adjuster, T, constructed, arranged, and operating substantially in the manner and for the purposes set forth.

8th, The combination with the lock plate, P, of the cam and needle guides or adjusters, E, substantially in the manner and for the purposes set forth.

9th, In combination with the wing cams, D, and their studs, g, the cams, O and Q, and latch, R, or their equivalents, whereby said cams, D, are moved upward simultaneously with the closing of the V-cam, C, for the purposes described.

10th, The combination of the plates, p, and studs, g, with the set nut, B, index hand, y, and scale, s', for the purposes set forth.

11th, In combination with the scale, s', for gaging the tension or length of the loop, the pivoted lever index, y, arranged and operating substantially as and for the purposes shown and described.

12th, The pivoted yarn carrier, Y, in combination with the friction traveler q, and the rod, W, all constructed, arranged, and operating as shown and described.

13th, The yarn carrier or guide, Y, slotted as shown and described and for the purposes set forth.

82,349.—FEMALE SYRINGE BED PAN.—Alvah Rittenhouse, M. D., Philadelphia, Pa.

I claim, 1st, The bed pan or vessel, J, capsular vulva, H, right angle suction tube, K, substantially as set forth.

2d, The vaginal extension tube, N, metallic valve tube, P, right angle suction tube, K, rubber bulb, R, vessel, J, capsular vulva, H, strainer, L, all combined and arranged substantially in the manner and for the purpose as herein set forth and described.

82,350.—TRACK LAYING MACHINE FOR RAILROADS.—Wm. D. Robertson, San Francisco, Cal.

I claim, 1st, As a new application to construction trains, for supplying power to carry forward from the rear car to the place of deposit, the rails and ties, the engines, a a, mounted on the central car, substantially as described.

2d, The shaft, f, with the screw, g, actuating the trucks, b b, by the beveled gear, k' l', or their equivalents, substantially as described.

3d, The pulley, u, on the rear truck axle of the engine, for driving the friction rollers which carry the ties to the incline trough beneath the boiler of the engine, substantially as described.

4th, The friction rollers, t and u, in combination with the channel or trough v, substantially as and for the purpose specified.

5th, The pulleys, g, and the belts, w and w'', or equivalent devices, for actuating the cutters, substantially as described.

6th, Carrying the rails forward at each side of the boiler, and lowering them to the road bed, by the davits, A A, substantially as described.

7th, The rollers, q q, r r' s s' s'' s''', the endless chains, p p', or equivalent device, for pressing down and holding the ties while the cutters trim them, substantially as described.

8th, The cutters, v' v'', for leveling and trimming the ties to receive the rails, constructed and operating substantially as described.

82,351.—MITER BOX.—Clark Robinson, Fox Lake, Wis.

I claim the plates, B C D, in combination with the frames, J J, guides, H H, having racks, F F, standards, L O, and pinion, G, the whole being constructed and arranged substantially as and for the purpose herein specified.

82,352.—CARPET BAG.—Anthony J. Robrecht, Newark, N. J.

I claim, 1st, The combination of one or more partitions with a traveling bag, valise, or trunk, produced by means of hooks and eyes, constructed to be employed in the manner and for the purpose specified.

2d, The combination of the metallic band, f, with the partition, e, and also the combination of said band with hooks or eyes, employed in the manner and for the purpose specified.

82,353.—MOLD FOR CASTING SLEIGH SHOES.—N. W. Russell, Cedar Falls, Iowa.

I claim, 1st, The sand flask or cope, A, and metallic mold section, B, constructed substantially as described, when used in combination with each other for the production of sleigh shoes, as set forth.

2d, The covering plates, J, in combination with the channeled metal section, B, and sand cope, A, substantially in the manner and for the purpose described.

82,354.—DEVICE FOR HOLDING CUT NAILS WHILE BEING HEADED.—Dennis Savery, Wheeling, W. Va.

I claim the arrangement of the lever, C, tappet, a, spring, D, plate, b, pad, e, cam, B, and shaft, A, in the manner and for the purpose specified.

82,355.—CORK PULLER.—Geo. W. Schermerhorn, East Limington, Me.

I claim the instrument for removing corks from bottles, consisting of the handle, A, having the stem, B, and spring loop, D, at right angles to each other, and provided respectively with the sliding disks, C and E, all constructed and arranged to operate as described, whereby the cork is first pushed into the bottle by the stem, B, and afterward withdrawn by the loop, D, the disks, C E, in both operations serving to prevent the contents of the bottle from spattering out, as herein shown and described.

82,356.—CHURN.—Jacob Shaw and W. A. Shaw, Hinkley, Ohio.

We claim, 1st, So hanging a rectangular or nearly rectangular churn box or case that its axis of rotation shall be diagonal to its sides, in the manner and for the purpose substanstially as set forth.

2d, The curved inclined rods and cross bar, in combination with the cap and churn, substantially as and for the purpose set forth.

3d, The hollow journal and valve in combination with the churn, arranged as and for the purpose substantially as herein specified.

82,357.—AUTOMATIC BOILER FEEDER.—Edwin Sheppard, Philadelphia, Pa.

I claim an automatic boiler feeder consisting of a cylinder, B, with its float, D, cylinder, F, with its pistons, i i', operated by the float, D, and cylinder, G, with its piston, m', the cylinder, F, communicating with the cylinder G, and the cylinder, B, with the cylinder, F, and the whole being arranged and applied to a steam boiler to regulate the flow of water to the same, substantially as described.

82,358.—FIRE ESCAPE LADDER.—George Skinner, Brooklyn, N. Y.

I claim, 1st, The peculiar arrangement and combination of the pivoted frame, K, caster wheel, M, rope or chain, O, and shaft, P, with each other and with the ladder, C, axle, B, and wheels, A, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the frame, D, and leg, d2, with the ladder, C, axle, B, and wheels, A, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the extension cross bar, E and e' e', with the ladder C, axle, B, and wheels, A, substantially as herein shown and described, and for the purpose set forth.

82,359.—CARBURETER.—Henry Slatter, Covington, Ky.

I claim, 1st, The arrangement of the water tanks, A and B, principal and auxiliary receivers, C and D, pipes, F H, and R, and tank, E, for the purpose set forth.

2d, The tank, E, adapted to contain both water and gasoline, and provided with the pipes, R H K, and M, and cocks, L L', as and for the purpose designated.

3d, In combination with the subject matter of claims, 1 and 2, the auxiliary carbureting chamber, O, or its equivalent.

82,360.—FOLDING TABLE.—William Smith, Cincinnati, Ohio.

I claim the combination, substantially as described, of the table, A, hinged frames, a B C D E, legs, F, hinged braces, G g d d' e' e', slides, H, under cut grooves, I i, stops, J, and spring bolts or catches, K, or their mechanical equivalents, for the object explained.

82,361.—HORSE COLLAR.—J. A. Sutherland, Elmwood, Ill.

I claim a horse collar, made of wood, when constructed substantially as above described.

82,362.—QUARTZ MILL.—Samuel Swesey, Malta, Ohio.

I claim, 1st, Suspending the stone, C, above the bed stone by means of the swiveled connections, F, and screws, h, in combination with the shaft, D, and stone, C, for the purpose of adjusting the grinding face of the stone, C, parallel to the grinding face of the bed stone, B, as herein shown and described for the purpose specified.

2d, The arrangement of the hopper, K, upon the yoke, E, whereby said hopper is revolved with the stone, C, as herein shown and described, for the purpose specified.

82,363.—BEEHIVE.—James Tallman, Clayton, Ill.

I claim, 1st, The arrangement and combination of a series of hives, provided with inclined bottoms, and resting on inclined bars, a, within a frame, in such a manner that the several hives may be made to communicate with or cut off from each, as may be desired, substantially as shown and described.

2d, The house, composed of the frame, A, and box, C, the latter being provided with doors, f, and with a lid or detachable top, F, when said house, thus constructed, is used in connection with a plurality of hives, B, adapted to the house or frame, in the manner substantially as and for the purpose set forth.

82,364.—SWEATS FOR HATS.—George W. Thompson, Brooklyn, N. Y.

I claim, as a new article of manufacture, a sweat band for hats formed of paper coated with japan or other water proof compound, and finished by embossing, substantially as described.

82,365.—REFRIGERATOR AND SIDEBOARD.—John A. Thompson, Auburn, N. Y.

I claim the construction of refrigerators and household preservatories of anglewood, skeleton frames, with their entire walls of trunk board, or its equivalent, filled with a concrete of plaster of Paris and granulated carbon, or other suitable material securing the same effects, all as specified and set forth.

82,366.—SEWING-MACHINE.—Jeptha A. Wagner, N. Y. city.

I claim, 1st, The feeding device, J, furnished with points on each side of an open slot, and a point or points in range with said slots, the said feeding points being applied, arranged, and operating substantially as described.

2d, The combination of the bridge, u, plate, I, and feeding device, J t t l, the said bridge being slotted, and the feeding device being forked and furnished with central and side points, substantially as and for the purpose described.

3d, The bridge, u, when slotted and provided with a forked or V-shape at one end, and a bevel and shoulder at the other end, in combination with the recessed removable plate, I, substantially as shown, and so that by one screw the bridge is confined in position.

4th, The bridge, u, constructed as shown in figs. 13 and 14, for the purpose described.

5th, The combination of the looper, H, the feed lever, J, with its central and lateral feeding points, slotted bridge, triple slotted presser foot, and upper needle, the said parts being constructed and arranged as described, and operated by a cam pulley, constructed as described.

6th, The cam pulleys, E F, constructed and arranged as described, in combination with the levers, E1 F1, rod, K, looper, H, looper guide, lever, p, C C6, needle, c, feed arm, J, bridge, u, and presser foot, V, all constructed and arranged and operating as described.

7th, The arrangement of a front elastic support, a2', for the cloth plate, B, forward of and centrally between the two rear hinging elastic supports, a2 a2, substantially in the manner and for the purpose described.

8th, The rear elastic sleeve bearings, a2, fitted in the hinging studs, a1, in combination with the hollow bearing boxes, a7, formed in the cloth plate, B, in the manner described.

9th, The gimbal joint, g, with the levers, E1 F1, applied to it, as shown in fig. 15, in combination with the feeding arm, J, looper guide, p, and the looper or lower needle, H, all constructed, arranged, and operating as described.

10th, The cloth plate, B, cast with a horizontal portion forward of the axis of the needle arm, C, and with a semicircular portion, B1, in rear of the horizontal portion, and also with a bracket, B2, and hollow bearing boxes, a 7, all substantially in the manner shown and described, and for the purpose set forth.

11th, The slotted cloth presser, V, in combination with the elevated bridge, u, and feeding points working on both sides of said bridge, substantially as described.

82,367.—HAMES AND STRAP FASTENER.—John B. Waterman, Summit, Mich.

I claim the arrangement, in a hames fastener, constructed as herein described, of the latch, D, having a forked end, E, and operating in combination with the spring, C, and ratchet bar, F, all constructed and operating as herein described and shown.

82,368.—LUBRICATOR.—G. Waters, Cincinnati, Ohio.

I claim a lubricator, constructed with a graduating screw or plug, in which is formed a gradually tapering slot or groove for regulating and controlling the discharge of oil, as described.

82,369.—CORN HUSKER.—Samuel Wesson, Worcester, Mass.

I claim, 1st, The hinged guard or separating plate, Z, in combination with the separating roll, X' and bars, V, substantially as and for the purposes stated.

2d, The combination, with the guard or hinged separating plate, Z, of the adjusting screws, 12 12, and stands, 14 14, as and for the purposes set forth.

3d, The combination of the shield, 15, with separating roll, X, and bars, V, substantially as and for the purposes set forth.

4th, The combination, with two or more sets of husking rolls, of a hinged ear covering plate, arranged as described, so as to retain the ears in proper contact with the rolls, and provided with one or more dividing pieces or partitions, extending between each two contiguous or adjoining sets of rolls, in the manner and for the purposes shown and set forth.

5th, The combination with each set of husking rolls, E F, of an auxiliary adjustable roll, H, arranged, with relation to the exterior or lower roll, E, of each set, in the manner and for the purposes shown and specified.

6th, The combination, with each set of husking rolls, of an adjustable auxiliary roll, H, made tapering at its upper end, substantially as and for the purposes set forth.

7th, The combination, with two or more sets of husking rolls and adjustable auxiliary rolls, of the removable ear covering plate and guide, I M, the ear guide, K, and chutes or ways, L, for delivering the ears to the auxiliary rolls, the whole being arranged to operate substantially in the manner and for the purposes shown and set forth.

8th, The combination, with two or more sets of husking rolls, of a continuous ear cover or shield, I, with its division piece or pieces, M, substantially as and for the purposes set forth.

82,370.—GAME.—William H. Wilsen, Providence, R. I.

I claim a game, consisting of a combination of the pointer, D, and plate or disk, C, of which one is movable and the other stationary, the movable part being set by means of a ball propelled by the player, as set forth.

82,371.—PUMP.—Samuel Woodruff and H. B. Beach, Hartford, Conn.

We claim the arrangement of the series of valves, D and E, in relation to cylinder, B, annular chamber, a and chamber, F, substantially as described for the purpose specified.

82,372.—BEE HIVE.—Valentine Zimmerman, Morris, Ill.

I claim, 1st, The slatted partition, E, arranged to support the frames, F, and the front ends of the lower frames, G, as herein shown and described.

2d, The securing of the lower comb frames, G, in position by means of the pins, i, and hooks, k, substantially as shown and described.

3d, The slides, C C, applied to the box or case, in connection with the springs, D, in the manner substantially as and for the purpose set forth.

82,373.—CAR STOVE.—William A. Allen, Medina, N. Y.

I claim the combination of the above described double door, having plates H and B, and screen, E, and provided with a lock, D, with the body of the stove and the flue, with the screen, F, therein, all being constructed and arranged substantially in the manner set forth.

82,374.—BUNG BORER.—John G. Baker and Henry Asbury, Philadelphia, Pa.

We claim the combination of the tapering tubular stock, A, its boring edge, x, reaming edge, x', and tapering screw, b, the whole being constructed and arranged substantially as and for the purpose herein set forth.

82,375.—DINING TABLE.—E. H. Bloebaum, and C. H. Nagel, St. Charles, Mo.

We claim, 1st, The central board, A, when composed of the pieces, a a1 a2 a3, and the annular rim, B, when composed of the pieces, b b1 d2 b3, when the said parts are united and arranged, substantially as herein shown and described, and for the purpose set forth.

2d, The arrangement of the frame, D, and legs, d d1 d2 d3 d4 d5 d6, herein shown and described.

82,376.—DREDGING MACHINE.—Albert Boschke, Boston, Mass.

I claim a dredging or excavating machine, in which are combined a floating hull, a, plow or scoop, a, and elevating buckets, all constructed and arranged to operate substantially as set forth.

82,377.—ANGLER'S REEL.—Williard H. Bradley, New York city.

I claim a fish line reel, composed of the two annular concaved disks, A A, as arranged on the shaft, f, with the space, g, at their peripheries, in combination with the frame, C C, constructed and operating substantially as and for the purposes set forth.

Also, in combination with the disks, A A, and conical journals of the shaft, f, the frame, C C, fixed to the foot plate, B, and provided with the variable connecting piece, d, for adjusting the bearings to the shaft, substantially as set forth.

82,378.—CLOTHES RACK.—B. K. Breneman, Newport, Pa.

I claim the arms, C C, grooved on their lower side, and provided with braces, E E, pivoted therein, so that they may lie in the same, and connected to the upright, A, substantially as and for the purposes herein set forth.

82,379.—CONNECTING ROD.—Edward Brown, New York city. Antedated September 16, 1868.

I claim the combination, with the double screw rod, C, of the two inclines, b and c, whether the said inclines be placed on the washer, E, and the end of the connecting rod, A, or on the two washers, D and E, substantially as herein described.

82,380.—SLED KNEE.—Benjamin F. Cady, Chittenango, N. Y.

I claim a sleigh knee having rod, A, and shield, H, constructed, combined and arranged, substantially as described, as a new article of manufacture.

82,381.—LIFTING JACK.—John Camp (assignor to himself and Henry Marshall), Olney, Ill.

I claim the combination of the reversible lever, B b b', the stand, A, and fulcrum pin, C, relatively arranged to operate in the manner described for the purpose specified.

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82,382.—HAY SPREADER.—Nathan Chapman, Milford, Mass.

I claim, 1st, Giving the rake teeth, when rakeing, a forward and an upward movement, and a backward and downward movement, in regular succession by means of the toothed wiper wheel, G, traversing bar, N, wiper seat, S, and springs, L L, constructed and arranged to operate substantially as described.

2d, Giving the teeth, when tedding, a forward and upward movement, and a downward and a backward movement in succession, by means of the toothed wiper wheel, G, traversing bar, N, and inclined plane and groove on the block, X, substantially as described.

3d, Hinging the inclined block, X, so that the rear end will rise and let the pin or roller pass under it as it moves backward, and catch on the top as it moves forward, substantially as described.

82,383.—MOP HEAD.—C. B. Clark, and E. L. Ferguson, Buffalo, N. Y.

We claim the nut, C, provided with flanges, c c', or equivalent, in combination with the collar portions, D D, formed with elongated openings, h, and ledges, i, substantially in the manner and for the purpose set forth.

82,384.—WAGON JACK.—W. Clifford, Mina, assignor to A. F. Jennings & Co., Dunkirk, and T. R. Coveney, Mina, N. Y.

I claim the swinging bar, D, pivoted to standard, B, with its free end resting on the disconnected lever, E, and guided by the straps, d, rigidly secured to the lever, so as to operate in the manner and for the purpose as described.

82,385.—EQUALIZER FOR VEHICLES.—J. J. Connelly, Chicago, Ill.

I claim a draft equalizer consisting of an evener or draft bar, A A, pulley, H I G J, and chains, O O, the chain, O, passing over the pulleys, H G, and providing a draft attachment for the outside trace of the nigh horse, and the inside trace of the off horse, and the chain, N, passing over the pulleys, J I, and providing a draft attachment for the outside trace of the off horse and the inside trace of the nigh horse, substantially as and for the purpose specified and shown.

82,386.—WASHING MACHINE.—Michael Culler, Fredericksburg, Ohio.

I claim, in a washing machine, suspended between the oblique standards, A A, and upon the rods, a a, the adjustable corrugated cylinder, G, hung upon the frame, D, and secured to operate in the tub, or inserted above it, by the clamps i i, all as herein shown and described.

82,387.—SEED SOWER AND HARROW COMBINED.—C. Curtis, Galesburg, Ill

I claim the hopper, B, drum, E, box, F, and bar, H, constructed and arranged as described, and combined with the adjustable frame, L, and revolving harrows, Z, substantially as set forth and for the purpose described.

82,388.—ARCHED BRIDGE.—Joseph Davenport, Massillon, Ohio.

I claim, 1st, The rods, N N, when used in combination with the arch, B, and posts, K K, substantially as and for the purpose specified.

2d, Supports, O, when used in combination with the arch, B, and rods, N N, substantially as and for the purpose specified.

3d, The lever posts, K, when constructed of the side plates, K K, bolts or rivets, k k, blocks, M M, and cross piece, L, and used in combination with the chord bolt washer iron, F, the shoe, G, the tension bolt, J, with straps, I I, attached thereto, and to the chords, A, the rods, N N, and the arch, B, substantially as and for the purpose herein specified.

82,389.—GLASS LIGHT.—W. A. Demuth, New York city.

I claim a glass light, constructed of solid glass rods, arranged in the manner described.

82,390.—COAL-MINING MACHINE.—G. E. Donisthorpe, Leeds, Eng. Patented in England Dec. 5, 1865.

I claim, 1st, The combination of the mining machine with a screw and nut to move it forward, and with a removable pillar to sustain the thrust of the screw, substantially as before set forth.

2d, The combination of the mining machine with a steadying bar, sustained by removable pillars, connected and supported as described, to steady the machine when at work, and prevent it from getting off the rails, substantially as before set forth.

82,391.—COAL-CUTTING MACHINE.—G. E. Donisthorpe, Leeds, Eng. Patented in England April 21, 1866.

I claim, 1st, The combination, substantially as set forth, of the rack on the rail, the geared pinion, the worm, and the hand wheel, with the lifting screw, l, whereby the feeding devices on the carriage may be released from the rail.

2d, The combination, substantially as set forth, of the carriage, the feeding mechanism, the guiding mechanism, and the cutting mechanism, for the purpose set forth.

3d, The combination, substantially as set forth, of the carriage, the cylinder, the cutter connected directly with the cylinder, and the mechanism for controlling the induction valve of the cylinder, whereby the valve is not wholly opened unless the cutter makes a full stroke, and, consequently, the depth of one cut regulates the force applied on the next stroke of the cutters.

4th, The combined arrangement of apparatus herein described, for cutting grooves or holes into the floor or roof of a mine.

82,392.—SASH FASTENER.—J. E. Downs, Lowell, Mass.

I claim the combination and arrangement of the hinge, e f, and fastener, k, when arranged for the purposes as described and fully set forth.

82,393.—COFFEE ROASTER.—J. E. Edmundson, Bartlett, Ohio.

I claim the arrangement of the plate, A, walls, B B, fixed cylindrical case, C, having the door, B', rotating interior cylinder, D, having the opening, d, in its side, and crank shaft, E, substantially as described and shown and for the purpose specified.

82,394.—APPARATUS FOR PRESERVING BEER, ALE, ETC.—R. Eickemeyer, N. Y.

I claim, 1st, The process, substantially as herein described, of preserving beer or other perishable liquids or substances, by the connection or combination of the vessel containing the same with a carbonic acid gas generating apparatus or reservoir, in such a maaner as that the contents of said vessel, or vacant space of the latter, is or are kept constantly charged with said gas, in a regular and automatic manner, as rapidly as said contents absorb the gas or contents of the vessel are drawn off, substantially as specified.

2d, The arrangement, in connection with the vessel containing the liquid or article requiring to be preserved, of an upper acid reservoir, B, and lower gas generator, C, for supply, in a regular and automatic manner, of the gas to said vessel, and whereby the gas is forcibly expelled into the latter by the superincumbent weight or pressure of the column of liquid acid, essentially as herein set forth.

3d, The arrangement of the said reservoir, B, gas generator, C, and washer, D, in an apparatus for supplying, in an automatic manner, carbonic acid gas to the vessel, or its contents requiring to be preserved, substantially as shown and described.

82,395.—PADDLE WHEEL.—P. Emerson, Carondelet, Mo.

I claim the paddles, E, when hinged to the outer rim of the wheel by means of journals, c, placed at their bottom edges, substantially as described and set forth.

82,396.—BRICK MACHINE.—J. A. Falconer and R. Graham, Jersey City, N. J., assignors to E. C. Bradford, J. H. Renick, and O. A. Clough, New York city, assignors to J. H. Renick.

I claim, 1st, The hinged hook, L, in combination with the spring, s, connecting rod, M, and crank pin, k, of the crank, K, connected with the driving power of the machine, substantially as and for the purpose described.

2d, In combination with the hinged hook, L, spring, s, connecting rod, M, and crank pin, k, of the crank, K, the adjustable clamp, m, all constructed and arranged substantially as and for the purpose set forth.

82,397.—TAKE-UP FOR THREAD IN SEWING MACHINES.—J. Fanning, Brooklyn, N. Y., assignor to J. S. Andrews, New York city.

I claim the eye, h, upon the arm, b, in combination with the eye, i, near the end of the lever, e, that moves the needle-bar, so arranged as to draw upon and tighten the thread between the eye, h, and the guide, k, on the needle bar, as the needle descends, for the purposes set forth.

82,398.—FARM GATE.—Gilbert Gibbs, Fairview, Ind.

I claim, 1st, The oblique link, a, in connection with the central lever, E, when so arranged as to draw the bolt, n, from the catch or socket, c, before opening the gate, substantially as shown and specified.

2d, In combination with bolt, n, lever, B, link, a, and central lever, E, the bars, S S, and hand levers, D D, all arranged to operate substantially in the manner and for the purposes as set forth.

3d, Attaching a panel composed of the post, G, diagonal, J, and bars, m m m, and sill, O, with a gate, when the panel is so arranged, that, by means of the notches in the post, G, the forward part of the gate may be raised, as described and shown.

82,399.—ROSSING MACHINE.—Charles Gilpin and Laurence T. Dickinson, Cumberland, Md.

We claim, 1st, The combination and arrangement, with a cutting device, of the rollers, B B1 B2 B3, provided with the teeth, e e e, and operated by belting and gearing in such a manner that they all have an equal and uniform motion, the two upper ones rotating in one and the same direction, and the two lower ones in the opposite direction, substantially in the manner and for the purpose specified.

2d, The arrangement of the knife, K, with reference to the rollers, B1 B3, substantially as and for the purpose set forth.

3d, The arrangement of the idle roller, a, in combination with the rollers, substantially as described.

82,400.—ROSSING MACHINE.—Charles Gilpin and Laurence T. Dickinson, Cumberland, Md.

We claim, 1st, The arrangement of the reciprocating saw, M, with relation to the rollers, substantially as described.

2d, The combination of the saw, M, pitman, H, spring, P, lever, R, and cam u, on shaft, W, substantially as described, and for the purpose specified.

82,401.—MANUFACTURE OF SMALL BEER.—O. F. Green and James E. Clark, St. Louis, Mo.

We claim, 1st, The ingredients hereinbefore mentioned, or their substantial equivalents, when subjected to the processes substantially as described.

2d, The beverage formed from such ingredients, as a new article of manufacture, substantially as set forth.

82,402.—GEAR CUTTING TOOL.—Jackson Harrington (assignor to himself and A. C. Lippitt), New London, Conn.

I claim the series of cutters, A A, in combination with the circular socket plate or holder, E, and confining plates, G G, arranged substantially as and for the purposes described and set forth.

Also, the circular cog, I, circular recesses, J, and brace nut, M, when used in combination with the cutters, A A, and holder, E, substantially as and for the purposes set forth.

82,403.—KNIFE FOR CUTTING GREEN CORN FROM THE COB.—Jackson Harrington (assignor to himself and A. C. Lippett), New London, Conn.

I claim the concave plate, C, with V-shaped cutters, D D, and guide rib, E, in combination with the rectangular shaped shank, B, arranged substantially as and for the purposes described and set forth.

82,404.—MACHINE FOR SHEARING SHEEP.—Geo. Harsin and C. T. Sanders, Kirkville, Iowa.

We claim, 1st, In combination with the cutter, C, the belt, B, and cord, B', running over pulleys, and kept taught by weights, arranged to operate substantially as and for the purpose set forth.

2d, The combination, in a sheep shearing machine, of a stationary blade, k, and oscillating blade, l, constructed and arranged, in relation to one another, substantially as set forth.

3d, The arrangement of the pulley, G, having a wrist pin, G1, slotted arm, H, oscillating cutter, l, and stationary knife, K, within the hollow case, C1, substantially as and for the purpose set forth.

82,405.—THILL COUPLING.—Jas. Haverly and Chas. A. Tibbitts, La Porte, Ind.

We claim, 1st, The construction of the clasp, A, with its box, B, attached thereto, substantially as shown and described.

2d, The construction of the arm, E, and the arrangement therefor with reference to the box, B, substantially as set forth.

82,406.—CULTIVATOR.—Archibald T. Heflin, Monmouth, Ill.

I claim, 1st, A two wheeled elevated draft frame, with a draft pole, C, secured upon the cross beam, B', of said frame, A, swiveling double tree, C', applied to the draft pole, and connected to links, b b, in combination with levers, c, and scraper carrying beams, D D, all combined, arranged, and operating substantially as described.

2d, The attaching hooks, J J, applied to links, b, which are connected to the double trees, C', and to levers, c c, said parts being employed in a machine constructed and operating substantially as described.

82,407.—STOVE PIPE ELBOW.—C. Hoeller, Cincinnati, Ohio.

I claim the elbow for stove pipes, constructed as herein shown and described.

82,408.—CLOTHES DRYER.—A. S. Hopson, Plainview, Minn.

I claim the flanged plate, C, and slotted sliding plate, D, in combination with the rod, a, nut, e, arms, B B, and plate, A, all constructed as described, and operating substantially as and for the purposes herein set forth.

82,409.—MACHINE FOR MAKING HORSE SHOES.—Ozial A. Howe, Jersey City, N. J.

I claim, 1st, The combination of the rotating pressure disk, G, the rotating die, F, and the oscillating frame, B, substantially as and for the purpose specified.

2d, The cutting lip or corner, i, so arranged upon the pressure disk, G, and in relation with the shoulder, m, of the die, F, as to sever the shoe from the bar, substantially as and for the purpose specified.

3d, The arrangement of the rotating presser cone, F*, upon the oblique shaft, I, when combined with the presser disk, G, and the rotating die, F, carried upon the oscillating frame, B, substantially as and for the purpose specified.

4th, The arrangement of the guide notch, b1, and wheel, c, upon the frame, B, and in relation with the rotating die, F, carried thereby, and the presser disk, G, substantially as and for the purpose specified.

5th, The arrangement of the spring, J, with reference to the rotating die, F, presser disk, G, and presser cone, F*, substantially as and for the purpose specified.

6th, The combination of the pusher rod, u, spring, v, and inclined plane, u*, with the shaft, C, and die, F, substantially as and for the purpose specified.

82,410.—GEARING FOR HARVESTERS.—Moses G. Hubbard, Syracuse, N. Y.

I claim, 1st, The combination of the two gear wheels, C and E, of unequal size, with the spur pinion, F, and main gear wheel, G, substantially as described.

2d, The employment of two or more concentric gear wheels, all of which may be made to revolve in driving the cutters, or one or more of which may be held stationary, for varying the speed of the cutters, as described.

3d, Two or more gear wheels, of unequal size, arranged upon line shafts, or upon a divided axle, in combination with a shifting clutch, whereby the speed of the cutters may be varied, as described.

82,411.—GEARING FOR HARVESTER.—Moses G. Hubbard, Syracuse, N. Y.

I claim, 1st, The combination of the driving gear wheels, E and F, of unequal size, attached permanently to the main cross shaft, and gearing into the two corresponding loose gear wheels, A and B, with sliding clutch, d, and the firmly attached gear wheel, H, on the cross auxiliary shaft, C, and the straight pinion and bevel wheel, I, revolving loosely on shaft, G, arranged and operating specifically as described.

2d, The triple gear as described, in combination with the means for changing the speed of the cutters, arranged and located relative to the main and counter shafts, substantially as and for the purpose specified.

82,412.—HARVESTER.—Moses G. Hubbard, Syracuse, N. Y., assignor to Hubbard Mower Company.

I claim, 1st, Attaching the seat by the two pivoted springs arranged one in advance of the other, and in the same plane, for the purpose and substantially as described.

2d, The seat plate, D, provided with the two sockets or recesses, arranged in line, as described, and adapted to receive and permit the adjustment of the seat springs, substantially as and for the purpose described.

3d, Mounting the driver's seat for a reaping machine upon springs so arranged as to preserve the horizontality of the seat, and at the same time to give it both a forward and downward motion, for the purpose and substantially as set forth.

82,413.—HARVESTER.—Moses G. Hubbard, Syracuse, N. Y., assignor to Hubbard Mower Company.

I claim, 1st, Connecting the cutting apparatus to the main frame, by the yielding elastic corner and the vertically sliding adjusting rod, arranged and operating as and for the purpose described.

2d, The set screw, V, in combination with the wear plate and hinged shoe, arranged substantially as and for the purpose described.

3d, The lifting arrangement, consisting of the raising handle, U, cam, B, and chain, C, combined and operating as described, whereby, when the cutting apparatus is raised, said lifting apparatus is automatically locked for holding the cutting apparatus in its elevated position, as set forth.

82,414.—HARVESTER.—Moses G. Hubbard, Syracuse, N. Y., assignor to Hubbard Mower Company.

I claim, 1st, Attaching the pole to the main frame specifically in the manner and for the purpose set forth.

2d, The combination of the main frame with the pole extension piece attached and arranged as shown for the purpose described.

82,415.—HARVESTER.—Moses G. Hubbard, Syracuse, N. Y., assignor to Hubbard Mower Company.

I claim, 1st, The curved wear plate, H, provided with the expanded perforated ears, whereby the hight of the cutting apparatus can be adjusted without interfering with the action of the straight pitman, substantially as set forth.

2d, The independent or detachable sustaining rod, by means of which the driver in his seat on the machine is enabled to raise and sustain the cutting apparatus, substantially as described.

82,416.—MANUFACTURE OF PAINT.—Wm. C. Hurd, New York city.

I claim, 1st, The combination of feldspar with oil and lead, zinc, or any other suitable material for paints and colors, substantially as set forth.

2d, In addition of dissolved linseed gum or saponaceous oil, mixed with linseed oil in the grinding, or mixing feldspar with any other suitable materials for paints or colors, substantially as set forth.

82,417.—BOOTS.—John P. Jamison, New York city.

I claim the arrangement of the longitudinal seam or seams, a, in the boot leg, so as to rise from the hollow of the shank, or thereabouts, or (when the latter is applied to the foot) in front of the ankle bone, the same also being curved, as at b, to admit of a forward extension of the counter, substantially as and for the purpose or purposes herein set forth.

82,418.—COMBINED LATCH AND LOCK.—Frederick L. Johnson, Walling ford, Conn.

I claim, 1st, The tumbler, D, held by spring, E, having a lateral motion to enable one bolt to act upon both as a lock and latch, constructed substantially in the manner herein set forth.

2d, The bolt, B, provided with projections, a a and b b, in combination with the tumbler, D, provided with arms, C C, and acted on by the said tumbler, substantially as herein set forth.

3d, The catch, F, held by the escutcheon, and arranged to act upon and keep the tumbler from sliding laterally, constructed in the manner substantially as herein set forth.

82,419.—ROOFING CEMENT.—John L. Kidwell, Washington, D. C.

I claim, 1st, A water and fire-proof composition, for roofing, flooring, etc., prepared of hydraulic cement, tar, sulphur, and naphthaline, or its equivalents, substantially as described and set forth.

2d, The above cement composition, incorporated with powdered minerals or metallic ingredients, substantially as described and set forth.

82,420.—CARRIAGE SHACKLE.—George G. Larkin, West Amesbury, Mass.

I claim the disk, a, provided with radial sockets, and carrying the pad, C, when formed with a screw threaded shank, e, adjustable in the front side of the clip, A, as herein described for the purpose specified.

82,421.—FIRE EXTINGUISHER.—W. H. Laubach, Philadelphia, Pa.

I claim, 1st, The tube, C, in combination with the diaphragm, E, and valve, D, and vent tube, a, operated and constructed substantially in described.

2d, The diaphragm, E, and spiral spring, f, constructed and operated as described.

3d, The cap, g, operating on the diaphragm, E, constructed and operated as described.

82,422.—CORN PLANTER.—John L. Leas (assignor to himself and Andrew B. Lerew), York Sulphur Springs, Pa.

I claim, 1st, The slide, C, in combination with the sheaves, E F, and straps, H, J, and K, as and for the purpose described.

2d, The pivoted levers, M and L, in combination with the elastic connections, I, as and for the purpose described.

82,423.—CULTIVATOR.—M. F. Lowth and T. J. Howe, Owatonna, Minn.

We claim, in combination with the mortised beam, A, and the tooth, B, having the shanks, b b', and pivoted on the bolt, c, a stirrup-shaped clamp, E, having an oblong or semi-circular opening, O, the side, o, of which, that bears against the shank, b', being straight, and said clamp being confined to the beam, A, and tightened or loosened by means of a screw shank, r, passing through a slot in the side of the beam, and a screw nut, a, fitting upon it outside of the beam, and screwing against the side of the beam, or against a washer, substantially as described.

82,424.—PLANE FOR CUTTING BLIND SLATS.—R. E. Lowe, Upper Alton, Ill.

I claim, 1st, The arrangement of the shoe, C, stock, A A', screws, c c', cutter iron, D, and clamping hooks and nuts, F G, substantially as described, when the parts are constructed to operate in the manner set forth.

2d, The arrangement of the guards, I I, with the knife, D, the track, C, and the gage, H, constructed and operating substantially as described.

82,425.—DRIVING HOOP.—Timothy Lucey, Salem, Mass.

I claim a driving hoop, having a construction substantially as described.

82,426.—CUPBOARD AND TABLE.—J. C. Mack, Bristol, Conn.

I claim the combination of the cupboard, A, shelves, F, and doors, D, with table, B, and legs, C, arranged substantially as and for the purpose specified.

82,427.—HAY ELEVATOR.—Harvey McCown and Luther M. McCown, Enon Valley, Pa.

We claim the jaws, I I, in combination with the disk, K, and wedge, L, or its equivalent, when constructed and operated substantially as and for the purpose herein shown and described.

82,428.—PIANO.—Frazee B. McGregor (assignor to himself and George A. Hoyt), Pontiac, Mich. Antedated September 14, 1868.

I claim the arrangement of the couplers, D D, horizontal bars, C C, placed one above the other, with the elbows, e e, and levers, d d, so that when the pedal raises the levers, the upper bar is raised against the couplers, parallel, and raises the coupler against the keys, coupling them together the entire length of the key board, right or left, or both, as herein set forth.

82,429.—PRESERVING FRUIT.—David M. Mefford, Norwalk, Ohio, assignor to himself and Stephen Boalt.

I claim, 1st, Preserving fruit by treating or charging the same with sulphurous acid gas, and then subjecting it to heat, in the manner set forth.

2d, Charging raw fruit with sulphurous acid gas preparatory to its being heated, by means of air pumps or bellows, substantially as set forth.

82,430.—CARVING MACHINE.—George Merrill, Newburyport, Mass., assignor to Samuel Blish, Piscataway, N. J.

I claim, 1st, The combination of the tables, D and P, connected by links or rods, n m, to the lever, h, substantially as described.

2d, The shaft, I, mounted in the main frame, and provided with the rigid arms, a and b, carrying the adjustable guide, c, and the cutter, d, and arranged in relation to the tables, D and P, substantially as described.

3d, The table, D, provided with the side pieces or frame, H I, for supporting the upper table, P, and permitting the latter to be moved thereon, as herein described.

82,431.—GRAIN SEPARATOR.—Clark W. Mills and Lewis S. Chichester (assignors to themselves and George H. Nichols), Brooklyn N. Y. Antedated Sept. 14, 1868.

We claim the adjustable curb, l, that can be moved towards or away from the point of delivery of the grain in combination with the adjustable blast regulator, k, applied substantially as and for the purposes set forth.

82,432.—GRAIN DRYER.—Clark W. Mills and Lewis S. Chichester (assignors to themselves and George H. Nichols), Brooklyn, N. Y. Antedated Sept. 10, 1868.

We claim the series of air tubes, b b, open at their under side, in combination with a hopper delivering the grain upon such series of tubes, in the manner set forth, so that a current of air shall pass through the grain as it falls from said hopper, and through the series of air tubes, and in contact with such grain, substantially as and for the purposes set forth.

82,433.—ROLLING MILL.—Foster Nevergold and David Brose, Pittsburg, Pa.

We claim, 1st, The shaft, J, crank, L, and pitman, M, in combination with the crank, N, movable collar, P, and shaft, O, all constructed and arranged as described, substantially as and for the purpose herein set forth.

2d, The combination of the table, V, arm, b, side pieces, X X, arms, T T, shaft, O, legs, U U, hinged leaf, Y, slotted arm, Z and the lever, d, all constructed and arranged as described, and operating substantially as herein set forth.

3d, The stay lever, r, swiveled pin, s s, and perforated lever rest, in combination with crab lever, p, all constructed and arranged in the manner and for the purpose substantially as herein set forth.

4th, The upright shaft, m, and pinion, B', in combination with pinion, C', shaft, A', pinions, F' F', cog wheels, E' E', and regulator, G', all constructed, arranged, and operating substantially as herein set forth.

82,434.—DOOR BELL.—W. H. Nichols, East Hampton, Conn.

I claim the lever, H, pivoted to the plate, A, at one end, and provided with a slot at its other, through which one end of the hammer wire passes, said lever being provided with lugs, d and e, by means of which it is connected to the spring, E, and to the bell rod, N; the lug, d, to which the rod, N, is attached, being centrally located upon the lever, to facilitate its operation, as and for the purpose specified.

82,435.—REFINING CAST IRON.—H. S. Osborn, Easton, Pa.

I claim the self-generating steam rabble, or the rabble in which the steam is generated by the heat surrounding the raoble, in the manner and for the purposes substantially as above described.

82,436.—MECHANICAL MOVEMENT.—Isaac E. Palmer, Hackensack, N. J. Antedated Sept. 14, 1868.

I claim the combination of the toothed wheel, A, with the ring, C, having a female thread, a, in or around it, arranged relatively to each other for operation together substantially as shown and described.

82,437.—RECIPROCATING STEAM ENGINE.—Francis S. Pease, Buffalo, N. Y.

I claim, 1st, The construction and arrangement of the frame, or covers, or cylinder heads of the two cylinders, the lowest section or surface forming a cover to the cylinder, B, and the upper surface the cover of the cylinder, A.

2d, The combination of the lower cylinder head, H', with the section, h, whereby to gain access to the cylinder, B, as herein set forth.

3d, The arrangement of the stuffing box inside the cylinder and with the cylinder head, so that the bolts passing through the cylinder head can be reached from the outside between the two heads.

4th, The combination of the two cylinder heads, H H', formed or connected together in the manner herein described, with sufficient space between them to give access to the bolts of the stuffing box, S.

82,438.—FRUIT BOX.—John M. Perkins (assignor to R. R. Perkins), Plainfield, N. J.

I claim a box constructed of two strips, of veneer, in which the top or bottom may be used as bottom or top indiscriminately, and constructed of two pieces of veneer, in the manner and for the purposes set forth.

82,439.—WAGON BRAKE.—J. S. Pfrimmer, Lanesville, Ind.

I claim the arrangement upon the front section of a vehicle of the forked rod, a, oblique rods, c c, levers, D D, keepers, d d, and spring, e, all constructed and operating as set forth.

82,440.—FASTENING FOR BUTTONS.—Alfred Rix, San Francisco, Cal.

I claim the headed shank and open washer for securing the button to the cloth or garment, constructed substantially in the manner and for the purpose set forth.

82,441.—WASHSTAND AND SICK CHAIR.—Valentin Schreck, Philadelphia, Pa.

I claim the described combination of a sick chair and portable washstand when the parts composing the former are permanently or otherwise attached to a swinging door, C, and otherwise arranged as and for the purpose specified.

82,442.—WINDOW SHADE FIXTURE.—Frederick A. Seborn, David R. Dunlap, and Joachim F. C. Geist, Zanesville, Ohio.

We claim the arrangement of the cord, C, pulleys, B B, roll, A, fixed cord, E, and cord, F, substantially as shown and described.

82,443.—DRAFT EQUALIZER.—Seth Shadduck, Elk River township, Iowa.

I claim the draft bar, F, provided with adjusting holes, c c c, etc., ring, K, substantially for the purpose described.

82,444.—SAFETY GUARD FOR LOCKS.—W. C. Sinclair, New York city. Antedated Sept. 18, 1868.

I claim the oscillating plate, g, having a projecting pin, i, in combination with the cam slot, j, on the latch, k, substantially as and for the purpose described.

82,445.—MODE OF HARDENING GAS-BURNER TIPS MADE FROM SOAPSTONE, ETC.—Henry J. Smith, Boston, assignor to Joseph C. Wightman, Newton, Mass.

I claim the hardening and rendering impervious to the action of acids and heat, of gas burners and gas-burner tips, or any part thereof, made from soap stone, talc, talcose rocks, or minerals, by heating them in a vessel containing carbon, substantially as above described.

82,446.—CHURN.—W. C. Smith, Yantic, Conn.

I claim the groove, c, and recess, m, on the gear shaft, C, and the lip, E3, and arm, E2, on the locking pin, E, constructed and adapted for joint operation relatively to each other and to the beater shaft, A, and to the gear wheel, D, as and for the purposes herein set forth.

82,447.—TUMBLING SHAFT FOR CONNECTING POWER WITH MACHINERY.—Daniel Snell (assignor to himself and J. H. Gano), Springfield, Ohio.

I claim the combination of the collar, C, with its interior bearing, c, and the block end, b, of the rod shaft, B, sliding in the groove, D, of the part, A, for retaining the shaft in position at any point in the line of its extension or contraction, as applied in a tumbling shaft for transmission of power by a rotary or revolving motion, the whole constructed substantially as described, as and for the purpose specified.

82,448.—PEGGING MACHINE.—J. W. Soule, Boston, Mass.

I claim the arrangement of the peg cutting mechanism, so that but one peg is cut at the end of the peg wood, which peg, after being cut, is fed forward under the driver, substantially as described.

Also, the combination of the ratchet driving-pawl, m, with a reciprocating slide, n, to which the pawl is jointed, and by means of which it is actuated, substantially as described.

Also, in combination with the peg feed wheel, d, feed ratchet, l, and ratchet driving pawl, m, the ratchet-detaining pawl, s', substantially as shown and described.

Also, in combination with the peg-wood feed wheel, d, the sprin, h, pressure of which is adjusted by the screw, k, substantially as set forth.

Also, in combination with the slide, b2, spring, d2, and lever, e2, the adjusting plate, h2, substantially as and for the purpose set forth.

Also, in combination with the ratchet driving pawl, m, and the reciprocating slide, n, to which the pawl is jointed, the cam, p, for driving the slide, n, through the lever, r, and connecting rod, s, substantially as shown and described.

82,449.—COAL STOVE.—S. B. Stewart, Brush Valley, Pa.

I claim the lower section, A, constructed as described, in combination with the metal plates or strips, d d, and upper section, C, all arranged substantially as and for the purpose set sorth.

82,450.—CARPENTERS' PLANE.—J. B. Tarr, Chicago, Ill. Antedated Sept. 16, 1868.

I claim, 1st, The combination of the central clamping and tightening device with the adjustable supports, C D, the said device and the supports being applied to a plane stock, and in the relation to the plane iron thereof, substantially as and for the purpose herein described.

2d, Making the two supports or abutments, C D, adjustable, substantially as and for the purpose herein described.

3d, Applying pressure to a plane iron between two supports, C D, through a device, E F, substantially in the manner and for the purpose herein described.

4th, Changing the pitch and tightening the plane iron by the same means, and at the same time, the means employed being constructed and operated substantially as herein described.

5th, The adjusting of the plane iron by means of the clamping device, composed of the screws, C D and E, nut, F, and plate, b, and applied in such manner that the bit is tightened, and the pitch changed at the same time and by the same means, when constructed to operate substantially in the manner described.

6th, Arranging the plane iron beneath the heads or shoulders of two adjustable bearings, C D, and under a shoulder of a nut, F, so that it may be adjusted by means of either or both of the bearings, C D, and may be tightened and have its pitch changed by the screw, E, all substantially in the manner and for the purpose described.

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82,451.—HARROW.—J. J. Thomas, Union Springs, N. Y.

I claim a hand brush or spiked harrow, constructed of pieces of plank, hinged together as described, and provided with numerous inclined teeth pointing backward at such an inclination as to cast off or slip over any stalks of weeds, straw, or other refuse matter, substantially as described.

82,452.—SPIKE MACHINE.—L. Thomas, Allegheny City, as signor to A. Kloman, Lawrenceville, Pa.

I claim, 1st, In a machine for making spikes and bolts, a sliding carriage, B, which carries the spike or bolt blank after being severed from its parent bar, and while firmly griped by pressing dies, in combination with a header, G, constructed and operating substantially as and for the purpose hereinbefore set forth.

2d, The pair of swinging and pointing tools, a', in combination with a pair of guiding and pressing rollers, H, arranged and operated substantially in the manner and for the purposes hereinbefore described.

3d, The cam, F, cam lever, c, and double parallel bars, l l, or their mechanical equivalents, all arranged with reference to one of a pair of pressing dies in a spike machine, to secure first a partial and then a complete closing of the dies on the spike blank, substantially in the manner and for the purposes above set forth.

4th, In the manufacture of railroad spikes, the header, G, with a slotted shank, hung and operated, substantially as above described, so that it shall except at the completion of the stroke of the machine, have its face inclined to the direction of the faces of the pressing dies, for the purposes hereinbefore specified.

5th, In a machine for making spikes, the arrangement of the cams, d and e, operating in cam yokes, substantially as described, so that one cam, d, which actuates the cutting and pointing tools, a', shall act a little in advance of the other cam, e, which operates the sliding carriage, b, in order that such tools, a', may be partially opened and closed in advance of the beginning of the motion of the carriage, substantially as above described.

6th, The combination, in a spike machine, of swinging pointing tools, a', pointing rolls H, pressing dies, b b', and header, G, substantially as and for the purposes above set forth.

82,453.—SAUSAGE STUFFER AND LARD PRESS.—Nathaniel S. Undercuffler, Norristonville, Pa.

I claim the combination of the vessels, H and J, constructed as specified, and connected, within the dovetailed recess in the table, with the standard, C, lever, E, and follower, F, all as herein shown and specified.

82,454.—CEMENT.—George William Upham, Amherst, N. H.

I claim the within described cement, composed of the ingredients herein named, and compounded in or about the proportions set forth.

82,455.—SHAFT COUPLING.—James S. Upton, Battle Creek, Mich.

I claim the sockets, B B, provided with gudgeons, C C, and connected to the slotted rings, A, by means of the pins, a a, secured in the slots, x x, by the leather keys, all as herein shown and described.

82,456.—JOINT FOR CARRIAGE TOP PROP.—Elbertson W. Waite, New Haven, Conn.

I claim, 1st, A joint, formed by combining segmental grooves, near the ends of the parts to be united, with a circular rib upon the joint piece, substantially as specified.

2d, The joint pieces, e, with circular ribs, d, entering segmental grooves, c, in the bars, a b, in combination with the cylinder, l, and bolt or rivet, l, substantially as specified.

82,457.—BEDSTEAD.—William M. Ward, and Peter Bennage. Eureka, Ill.

We claim a bedstead, having rods, C, hooks, D, swivels, E, screws, G, pinholes, a, slats, d, strips, e, and blocks, b, all arranged and operating substantially as described.

82,458.—LAMP.—Charles Webber, and Henry Reimann, West Meriden, Conn.

We claim the construction and arrangement of the cup, B, recessed thimble, D, supporting sleeve, C, open platform, E, air sleeve, F, and cone, G, as and for the purpose described.

82,459.—SOAP AND DETERGENT COMPOUND.—Henry W. Weedon, High Point, N. C.

I claim the particularly specified combination of ingredients, and the definite quantities of the same, as set forth.

82,460.—STEAM GENERATOR.—S. Lloyd Wiegand (assignor to Walter J. Budd), Philadelphia, Pa. Antedated September 4, 1868.

I claim, 1st, The oblique or spiral deflectors or guides in double boiler tubes, substantially as shown and described.

2d, The tangential or spiral mouths, as shown, for conducting a supply of fluid to the descending columns in double tube boilers, as shown and described.

3d, The deflecting caps or domes, or the equivalents thereof, substantially as shown and described.

4th, The conical adjutages, C C, substantially as shown and described.

82,461.—ROTARY EMBOSSING PRESS.—I. M. Wilbur, Cleveland, Ohio.

I claim, 1st, The combination of the rollers, B C, impression plates, D, and counter plates, D', operated by means of the lever, E, through the medium of the cog wheels, F and C', the whole being constructed and arranged in the manner shown and described, as and for the purpose set forth.

2d, The lever, E, with its adjustable pawl, F, in combination with the rollers, B C, arranged to operate as and for the purpose described.

82,462.—INK PAD FOR HAND STAMP.—I. M. Wilbur, Cleveland, Ohio.

I claim the improved ink pads herein described, consisting of the blocks, A A', provided with the composition inking surface, C, in combination with the ink reservoir, H, distributing rollers, G G, mounted on the carriages, D D, the guide rods, B B, and handles, K K, all constructed and arranged to operate substantially as and for the purpose set forth.

82,463.—MACHINE FOR FORMING STEREOTYPE PLATES.—I. M. Willbur, Cleveland, Ohio. Antedated September, 16, 1868.

I claim, 1st, The roller, C, having a milled or file cut circumferential surface, for the purpose described, in combination with the apron, D, arranged and operating as and for the purpose set forth.

2d, The sliding bed, E, having a head or upright, g, with its curved surface, and the adjusting set screw, H, in combination with the roller, C, and arod D, all constructed and operating as described, and for the purpose set forth.

82,464.—STEREOTYPERS' PUTTY.—I. M. Willbur, Cleveland, Ohio. Antedated Sept. 17 1868.

I claim the composition hereinabove described, for the purposes specified.

82,465.—HAND BRUSHING AND POLISHING APPARATUS.—William H. Willson, New York city.

I claim, 1st, So arranging the coiled spring and the system of gearing within the cylindrical body furnished with axial handles, as to secure the rotary movement of such body, substantially as herein set forth.

2d, The arrangement of the friction brake within the cylindrical body furnished with axial handles, whereby the rotary movement of the same may be stopped, substantially as herein set forth.

3d, The arrangement of the coiled spring, the system of gearing, the stem of the handle, A*, and the frame, A, with reference to each other and the friction pinion, m, dividing the cylindrical body, B, substantially as and for the purpose specified.

82,466.—CAR WHEEL.—William Wilmington, Toledo, Ohio.

I claim the within described method of casting car wheels of two qualities of iron, that is to say, one of said qualities of iron being poured into the portion of the mold designed to form the hub of the wheel, and the other being poured into that portion of the mold designed to form the rim of the wheel, the two currents of iron meeting within the mold, and there acting upon and mingling with each other, substantially as set forth.

Also, as an improved manufacture a car wheel produced of two qualities of molten iron, by the method herein set forth.

82,467.—OIL GLOBE FOR STEAM CHEST.—Charles A. Wilson, Cincinnati, Ohio.

I claim the arrangement, as described, of the globe, A, hub, C, cock, E, apertures, F G, recess, H, channel, l l, passages, J j K l, and channel, P, as herein described.

82,468.—COMPOSITION FOR DESTROYING INSECTS ON POTATO PLANTS.—James P. Wilson (assignor to himself and V. R. Dafoe), Elmwood, Ill.

I claim a powder, prepared of the materials and in the manner specified, to be used for the destruction of potato bugs.

82,469.—WHIFFLE TREE HOOK.—James Wood, Utica, N. Y.

I claim the cap, B, with the hook, B', cast or attached to it both shaped and constructed as herein shown, and secured to the whiffletree in the manner and for the purposes herein shown and described.

82,470.—MAKING NUTS.—Oliver W. Yale, Hartford, Conn.

I claim the arrangement of the cams, c c', cam grooves, F F', and crank shaft, C, with the cross head, D, levers, U P, and toggles, R R, in the manner described.

Also, the arrangement on the anvil, L, of the stationary die, K, slides, M O, edge swages, 2 2, and stripper, U, in the manner described and for the purpose set forth.

Also, the combination of the punches and face swages with the edge swages, the transferrer and the anvil block, all constructed, arranged and operated substantially as described.

82,471.—APPARATUS FOR EXTINGUISHING FIRE.—George Clark, Jr., Boston, Mass.

I claim the combination and arrangement of the water tank, C, the compartments, G and H, and the pumps, J and K, (the latter being disposed within the intermediate compartments, I, and both being connected with the air chamber), the pipes, a a and c d, in addition to the ordinary feed and discharge pipes of the pump

82,472.—ARMY WAGON.—Alfred Sully, United States Army.

I claim, 1st, The body, C, constructed as described, and provided with seats, F F F and E, receptacle, L, and railing, M, all substantially as and for the purposes herein set forth.

2d, In combination with the seats, F F F, the hinged dash boards, G G G, and foot boards, H H H, substantially as and for the purposes herein set forth.

3d, In a wagon provided with suitable seats and foot boards, the employment of sectional tent pieces, I I I, substantially as and for the purposes herein set forth.

4th, The combination of the body, C, seats, F F F and E railing, M, receptacle, L, dash boards, G G G, foot boards, H H H, and folding tent pieces, I I I, all as herein shown and described.

82,473.—LOCK NUT AND TIGHTENER.—H. W. Olney, R. R. Logan and J. H. Fisher, Allegheny City, Pa.

We claim the lock nut and tightener above described, consisting essentially of the coiled spring, e, bent and attached to the nut and the part, C', in the manner shown and operating in connection with a screw, d, substantially as described.

REISSUES.

46,699.—PICTURE CARD FRAME.—Dated March 7, 1865: reissue 3,125.—Garret P. Bergen, Brooklyn, assignee of R. W. Potter, New York city.

I claim, 1st, A card frame for a picture, formed with an opening embossed around its edges, substantially as set forth.

2d, Cutting a hole and simultaneously embossing the border in a picture frame, substantially as described.

74,497.—SCROLL SAW.—Dated February 18, 1868; reissue 3,126.—B. J. Camp, Marion, Ohio.

I claim 1st, Securing or clamping the lower end of the saw blade, B, to the slotted pin, F, by means of the sleeve, a, and grooved set screw, b, the tenon thereof being inserted into a hole in the saw, so that the saw is clamped between the shoulder of said set screw and side of the pin, F, substantially as herein set forth.

2d, The forked adjustable springs, H and I, arranged as described, one above and one below the saw table, for the purpose of obviating the danger of breaking the saw, at the same time as they act as guides for it, substantially as herein set forth.

3d, The up-and-down adjustable guide bar, G, carrying the bent spring, H, constructed and arranged to operate substantially as herein set forth.

58,317.—HARVESTER RAKE.—Dated October 9, 1866; reissue 3,127.—Joseph Dick, Jr., Osnawa county, Ontario, and Eugene Glen, Rochester, N. Y., assignees, by mesne assignments, of Joseph Dick, Jr.

We claim, 1st, The joint ball, g, working within the pulley or case, B, both constructed and operating, with reference to each other, substantially as shown and described, for the purpose of communicating power to and in combination with an automatic rake for harvesters.

2d, The hanger, A, the pulley or case, B, and the joint ball, g, all constructed and operating with reference to each other, substantially as shown and described, for the purpose of communicating power to and in combination with an automatic rake for harvesters.

3d, The employment of a continuously-rotating extensible or sliding tumbling shaft, in combination with a vibrating sweep rake, for operating the same, substantially as described.

4th, The arrangement of the sections, G and G', upon the vertical sleeve, f, and the segmental pinions, C and C', upon the horizontal driving shaft, E, of the raker, as shown, so as to constitute, collectively, an entire circle of gearing as shown and described.

5th, The combination of the detachable pulley, T, with the sleeve or ferrule S, having one or more locking pins, c, substantially as and for the purpose set forth.

6th, The arrangement of the elevating lever, L, ratchet, O', head Q, chain, U, and pulley, V, in combination with each other and brace of the shoe, as and for the purpose set forth.

15,735.—HARVESTER.—Dated September 16, 1856, reissue 3,128.—Division F.—William Gage, Buffalo, N. Y., and Andrew Whiteley, Springfield Ohio, assignee of William Gage.

We claim the harvester's cutting apparatus, having the shoe, M, the finger bar, N, and the narrow divider, O, or their equivalents, constructed and combined, substantially as herein described, so that this cutting apparatus will have one axis of motion between said shoe and the frame of the machine, to which said shoe is connected, upon which the outer end of said cutting apparatus may rise or fall within the limit allowed it with the undulations of the ground over which it is drawn, without affecting or being affected by the height of said axis or the vertical position of the cutter's driving wheel.

The combination of the hereindescribed shoe, M, finger bar, N, and narrow divider, O, or their equivalents, in the harvester's cutting apparatus, when one of these portions of said divider, which supports the crop while being cut, is of less width than the other, substantially as and for the purpose set forth.

The combination of the shoe, M, finger bar, N, and narrow divider, O, or their equivalents, in the harvester's cutting apparatus, with the coupling frame, F, or an equivalent thereof, to enable the axis at the inner end of this cutting apparatus to be raised or lowered in respect to the main frame, substantially as and for the purpose described.

The combination of the coupling frame, F, and the pivots, I I, or their equivalents, with the main frame of the harvester, so as to have one portion or end of the hinge between these frames in front, and one in the rear of the axle of the cutter's driving wheel, substantially as, and to obtain the advantages described.

The combinations of the inward projections, l l, and the plate, G, or their equivalents, with the shoe, M, finger bar, N, and the narrow divider, O, in the harvester's cutting apparatus, to limit the downward vibrations of the outer end of this cutting apparatus, substantially as described.

The combinations of the slots, m m, the bolt, n, the washers, o o, and the screw nuts, p p, or an equivalent arrangement of parts, with the shoe, M, finger bar, N and narrow divider, O, in the harvester's cutting apparatus, to hold up the inner end of this cutting apparatus, substantially as and for the purpose set forth.

The combination of the track clearer, T, or its equivalent, with the shoe, M, finger bar, N, and narrow divider, O, in the harvester's cutting apparatus so as to separate the grass cut by this apparatus from that which is to remain uncut, substantially as described.

The combination of the carrying wheel, P, or its equivalent, with the shoe, M, finger bar, N, and narrow divider, O, in the harvester's cutting apparatus, so as to carry the divider in one of the ways named, substantially as and for the purpose specified.

65,377.—MODE OF DRYING GLUE.—Dated June 4, 1867; reissue 2,971, dated June 9, 1868; reissue 3,129.—A.—George Guenther, Chicago, Ill.

I claim, 1st, Drying glue by wetting solid surfaces with the glue in a liquid state and allowing it to dry thereon in thin flakes, as herein specified.

2d, Facilitating the drying of glue in thin scales or flakes on solid surfaces by circulating air therewith, as herein specified.

3d, In the production of scale glue on solid surfaces, the employment of artificial heat within the solid surfaces, or in the air, or both, as herein specified.

4th, The mode of drying glue in thin scales, by revolving or rotating surfaces, having their temperatures raised either by steam or hot air, substantially as described.

5th, Drying glue on thin revolving disks, as and for the purpose herein set forth.

65,377.—MACHINERY OR APPARATUS FOR DRYING GLUE—Dated June 4, 1867; reissue 2,971, dated June 9, 1868; reissue 3,130.—B.—George Guenther, Chicago, Ill.

I claim, 1st, The perforated case or air distributer, E, arranged as represented relatively to the drying surfaces, A, and to the current of air artificially thrown thereon, for the purposes herein set forth.

2d, The surfaces, A, and trough, B, with operating means, C, or their equivalents, whereby the surfaces, A, are immersed in the liquid glue and removed therefrom at will, substantially as and for the purposes herein set forth.

40,571.—ROTARY STEAM ENGINE.—Dated November 10 1863; reissue 3,131.—Metropolitan Engine Company (assignees, by mesne assignments, of Adolph Millochau), New York city.

We claim the pipes, i, l, n, and, o, and valves or cocks, k, k', m, and m', in combination with the ring, c, and pistons acting in the steam spaces, y and z substantially as specified.

54,494.—MANUFACTURE OF PAPER COLLARS, ETC.—Dated May 1, 1866; reissue 3,132.—George W. Ray, Springfield, Mass.

I claim paper, embossed and enameled upon either one or both sides, whether before or after its conversion into articles of wearing apparel, all substantially as herein described.

18,872.—BORING MACHINE.—Dated December 15, 1857; reissue 3,133.—Arcalous Wyckoff, assignee, by mesne assignments, of La Fayette Stevens, Elmira, N. Y.

I claim, 1st, The oblique traversing rests, O O, in combination with the screws, t t, and pinions, n n, when arranged in relation to one another, and used in connection with the dog, Q, and chain, P, for the purpose of adjusting the timber to the auger, and holding it firmly, substantially as set forth.

2d, The combination of the staff, K, worm, l, pinion, J, and rack, I', arranged to operate the traversing bed, E, substantially as set forth.

3d, An annular auger cutter head, the cutting lips of which project in the direction of its rotation, and are formed on a curved and oblique line, substantially as set forth.

4th, The loose independent collar, f, provided with knife edges, g g, to keep it from turning, for the purpose of furnishing a bearing for the head of the auger while in operation.

5th, The sharp annular spur, c, for the purpose of centering and guiding the auger, and at the same time leaving a core of the material bored in the center of the auger, in the manner specified.

80,456.—NUTMEG-GRATER.—Dated July 28, 1868; reissue 3,134.—J. L. Coles, and D. H. Coles, New York city.

We claim a box, A, containing a revolving carrier, D, having a series of chambers with spring followers, which press the articles to be grated against the stationary grating surface, E, which is combined with a receiver, F, all as shown and described.

Also, the combination with the cylindrical box, A, of a series of carriers at angles to each other, so as to leave supplementary chambers, b, substantially as and for the purpose set forth.

Also, the slots or openings, g, in front of the teeth, t, of the grating surface, said slots being formed by actually cutting or leaving out a portion of the metal, substantially as and for the purpose described.

25,253.—FAUCET.—Dated August 30, 1859; reissue 3,135.—Division B.—Albert Fuller, New York city.

I claim, 1st, An elastic plug valve encased in the above described metallic shield, for the purposes set forth.

2d, An elastic plug valve encased in a metallic shield, as described, when the shield is constructed to present a valve face which is transversely or laterally exterior to the plug, in combination with a valve seat or seats to both the elastic and metallic faces of the valve, substantially as shown and described.

63,729.—HORSE RAKE.—Dated April 9, 1867; reissue 3,136.—James La F. King and Wm. W. Watson (assignees of Watson King), Springfield, Ill.

I claim, 1st, The extension of the crank arms, a, on each side of the rake head below the axle, in the crank form, as applied to horse rakes, for the purposes herein shown and in the manner described.

2d, Attaching the traces to the end of the crank or draft arms, a, which are extended below the center of the wheels from each end of the rake head, to make these the point of draft, in the manner herein described and for the purposes set forth.

3d, The forming spring or brace on the butt end of the tooth, said brace being formed with or without a loop, for the purpose set forth and in the manner described.

4th, At aching the tooth, H, to the rake head, a, by means of a straight or beveled mortise and key, for the purpose set forth and in the manner described

5th, Attaching the tooth, H, to the rake head, a, by passing the loop over and around the head, for the purposes herein set forth and in the manner described

6th, The thimble or metal band, g, as a means of securing and completing the brace or spring, formed by the connection of the end of the tooth bent over with the main body of tooth, for the purposes herein set forth.

78,852.—ANCHOR.—Dated June 9, 1868; reissue 3,137.—Frederick Wittram, San Francisco, Cal.

I claim, 1st, Openings made lengthwise in the shank of an anchor, through which arms or flukes move freely to either side, substantially as herein described.

2d, The placing of two or more jointed arms or flukes at different portions of the shank's length, at or about at right angles to each other.

DESIGNS.

3,194.—SPOON HANDLE.—B. D. Deiderhase, New York city.

3,195.—SPIRIT LEVEL.—L. L. Davis, Springfield, Mass.

3,196.—LOWER PORTION OF A GORED SKIRT.—Thomas Dolan, Philadelphia, Pa.

3,197 to 3,199.—STOCKING FABRIC PATTERN.—Thomas Dolan Philadelphia, Pa. Three patents

3,200 and 3,201.—CARPET PATTERN.—Israel Foster, Philadelphia, Pa. Two patents.

3,202.—TABLE FORK.—J. W. Gardner Shelburne Falls, Mass.

3,203 to 3,206.—STOVE.—William Hailes (assignor to John F. Rathbone & Co.), Albany, N. Y. Four patents.

3,207.—TRADE MARK.—F. A. Hasenclever, New York city.

3,208.—TRADE MARK.—Joseph H. Jessop, Cambridge, Mass.

3,209 and 3,210.—FLOOR CLOTH PATTERN.—Victor Meyer, Kearney, N. J., assignor to Edward C. Sampson, New York city. Two patents.

3,211.—CLOCK CASE.—Solomon C. Spring (assignor to Welch, Spring & Co.), Bristol, Conn.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,033.—CARTRIDGE FOR BREECH-LOADING FIRE-ARMS.—Wm. H. Crocker, Boston, Mass. June 24, 1868.

2,421.—CLOSING CANS, BARRELS, ETC.—Edward Jenkins, Ravenswood, N. Y. Aug. 1, 1868.

2,565.—ELLIPTIC SPRINGS FOR VEHICLES.—Joseph Palmer, Concord, N. H. Aug 17, 1868.

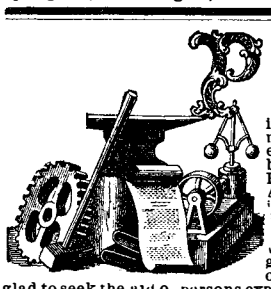
2,567.—APPARATUS FOR CLEANING GRAIN.—Simon Howes and Alphus Babcock, Silver Creek, N. Y. Aug. 17, 1868.

2,601.—ROTARY ENGINE.—Frederick Ortlieb, Greenpoint, N. Y., and Edward White, New York city. Aug. 20, 1868.

2,605.—APHARATUS FOR MANUFACTURING FLOUR.—Henry B. Sears, New York city. Aug. 21, 1868.

2,621.—UNITING THE ENDS OF RAILWAY RAILS.—Daniel R. Pratt, Worcester, Mass. Aug. 22, 1868.

2,628.—CARTRIDGE FOR BREECH LOADING FIRE-ARMS.—Samuel Norris, Springfield, Mass. Aug. 24, 1868.



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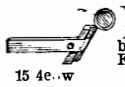

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 18, 1868.

Thomas Slaight, of Newark, N. J., having petitioned for an extension of the patent granted him on the 2d day of January, 1868, for an improvement in "Padlocks" it is ordered that the said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted to him on the 24th day of June, 1851, for an improvement in "Machinery for Cutting Rattan," etc., (this application having been authorized by act of Congress, March 2, 1867), it is ordered that said petition be heard at this office on the 24th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept. 21, 1868.

Joseph S. Winsor, of Providence, R. I., having petitioned for the extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machines for making Weavers' Harness," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

13 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept. 23 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for the extension of a patent granted him the 2d day of January, 1855, for an improvement in "Machine for Splitting Rattans into Strips," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.

Jarvis Case, of Lafayette Ind., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, reissued on the 16th day of November, 1858, and again reissued on the 17th day of April, 1866, for an improvement in "Seed Planters," it is ordered that said petition be heard at this office on the 21st day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

14 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.

George W. Hubbard and William E. Conant, of New York city, having petitioned for an extension of the patent granted them on the 9th day of January, 1855, and reissued on the 18th day of September, 1866, for an improvement in "Operating Shoe Valves in Direct Action Engines," it is ordered that said petition be heard at this office on the 21st day of December, next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

14 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 7, 1868.

R. F. Brown, Dorchester, Mass., having petitioned for an extension of the patent granted him on the 12th day of December 1854, for an improvement in "Hanging Carriage Bodies."

It is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted him on the 12th day of December, 1854, for an improvement in "Rattan Machine," it is ordered that said petition be heard at this office on the 23d day of November next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.

13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept., 9th, 1868.

James E. Simpson, of Brooklyn, N. Y., having petitioned for an extension of a patent granted him on the 5th day of December, 1854, for an improvement in "Dry Docks," it is ordered that said petition be heard at this office on the 23d day of November next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.

13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept 9, 1868.

Charles Danforth, of Paterson, N. J., having petitioned for the extension of a patent granted him on the 12th day of December, 1854, for an improvement in "Throstles for Spinning Cotton," it is ordered that said petition be heard at this office on the 23d day of November next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

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